Axle and Suspension
VN, VHD, VAH
Section 6

Introduction

This document provides information on axle and suspension applications in Volvo vehicles.

Note: We have attempted to cover as much information as possible. However, this information does not cover all the unique variations that a vehicle may present. Note that illustrations are typical but may not reflect all the variations of assembly.

All data provided is based on information that was current at time of release. However, **this information is subject to change without notice**.

Contents:

Front Axle

VN Front Axle Options

Manufacturer	Axle Model	Axle Drop	Weight Rating	Hub Type	Sales Code	SWB (<190) Inner Wheel-cut	SWB (<190) Outer Wheel-cut	MWB (191–230) Inner Wheel-cut	MWB (191–230) Outer Wheel-cut	LWB (<231) Inner Wheel-cut	LWB (<231) Outer Wheel-cut
Meritor	FF961	3.5”	12,000 lbs.	Basic	370113	50	35.8	50	38.6	50	38.6
		3.5”	12,500 lbs.	Basic	370342						
	FF965	3.5”	12,000 lbs.	Unitized	370365						
		3.5”	12,500 lbs.	Unitized	370343 370366						
	FF967	3.5” (Double Drop	12,100 12,500 13,200 lbs.	Unitized	370383 370384 370328						
	FG943	5”	14,600 lbs.	Basic	370031						
	FG941	5”	14,600 lbs.	Basic	370031	45	31.5	45	35.3	45	35.3
Hendrickson	Steertek	4.2”	12,000 lbs.	Basic	370351	50	35.7	50	37.8	50	37.8
			12,000 lbs.	Unitized	370355						
			12,500 lbs.	Basic	370352						
			12,500 lbs.	Unitized	370356						
			13,200 lbs.	Basic	370353						
			13,200 lbs.	Unitized	370357						
			14,600 lbs.	Basic	370354						
Dana Spicer	E-12021	3.5”	12,500 12,000	Basic Basic	370045	50	34.9	50	37.7	50	37.7

Manufacturer	Axle Model	Axle Drop	Weight Rating	Hub Type	Sales Code	SWB (<190) Inner Wheel-cut	SWB (<190) Outer Wheel-cut	MWB (191–230) Inner Wheel-cut	MWB (191–230) Outer Wheel-cut	LWB (<231) Inner Wheel-cut	LWB (<231) Outer Wheel-cut
VOLVO	VF	3.5”(-Double Drop)	12,000–14,600	Unitized	370308 370369 370370 370372	50	34.7	50	36.6	50	37.9

Notes:

- The Dana Spicer Axle is a CE options.
- The Dana Spicer Axle can only be used with the VOAS Rear Suspension.
- The FF943 is only used for the 160 mm (6.2 in) ride height option.
- 24.5" wheels and 315/80R22.5 tires may not achieve maximum wheelcut.

Notes

VHD Front Axle

VOLVO VF Axle Type

TIRE	Wheel Inset (Inch)	Overall Width Cen-terline of Tires (in)	Overall Width Outside of Tire Bulge (in)	AXLE FWD Turn Angle						AXLE BACK Turn Angle					
				Wheelbase (in)						Wheelbase (in)					
				134 - 190		191 - 230		231 - 312		134 - 190		191 - 230		231 - 312	
445/65R22.5 (13" RIMS)	4.30	84.5	102	28°	23.3°	27°	23.3°	25°	22.6°	37°	28.7°	35°	28.6°	32°	28°
	5.25 – 5.30	82.5	100	23°	20°	22°	19.5°	21°	19.3°	33°	26.5°	31°	26°	29°	25.7°
425/65R22.5 (13" RIMS)	4.30	84.5	102	28°	23.3°	27°	23.3°	25°	22.6°	37°	28.7°	35°	28.6°	32°	28°
	5.25 – 5.30	82.5	100	23°	20°	22°	19.5°	21°	19.3°	33°	26.5°	31°	26°	29°	25.7°
425/65R22.5 (12.25" RIMS)	4.00	85.1	100.2	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	43°	33°	41°	34.1°
	4.75	83.6	102	29°	24°	28°	24°	27°	24.2°	37°	28.7°	35°	28.6°	33°	28.7°
385/65R22.5 (12.25" RIMS)	4.00	85.1	100.6	40°	30.2°	38°	30.4°	36°	30.8°	45°	32.4°	42°	32.5°	39°	32.8°
	4.75	83.6	99.2	35°	27.6°	34°	28°	32°	28°	45°	32.4°	41°	32°	37°	31.5°
315/80R22.5 (9" RIMS)	3.12	86.9	99.2	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	44°	36°
	5.25	82.6	94.9	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	44°	36°
	5.94 – 6.04	81.1	93.4	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	43°	33°	39°	32.8°
	6.38	81.9	94.2	39°	29.7°	37°	29.8°	35°	30.1°	43°	31.6°	40°	31.5°	37°	31.5°
295/80R22.5 (8.25" RIMS)	5.63 – 5.73	81.7	93.2	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	80.8	92.3					39°	32.9°			43°	33°	40°	33.5°
275/70R22.5 (8.25" RIMS)	5.66 – 5.71	81.7	92.6	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	80.9	91.8												
255/70R22.5 (8.25" RIMS)	5.66 – 5.71	81.7	92	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	80.8	91.2												
12R24.5 (8.25" RIMS)	5.63 – 5.73	81.7	93.2	40°	30.2°	40°	31.5°	39°	32.9°	45°	32.4°	43°	33°	39°	32.8°
	6.13 – 6.16	80.8	92.3			37°	29.8°	35°	30.1°	40°	30.2°	37°	29.8°	35°	30.1°
12R22.5 (8.25" RIMS)	5.63 – 5.73	81.7	92.7	40°	30.2°	40°	31.5°	39°	32.9°	45°	32.4°	43°	33°	39°	32.8°
	6.13 – 6.16	80.8	91.8			38°	30.4°	35°	30.1°	43°	31.6°	40°	31.5°	37°	31.5°
11R24.5 (8.25" RIMS)	5.63 – 5.73	81.7	92.7	40°	30.2°	39°	30.9°	40°	33.5°	45°	32.4°	43°	33°	40°	33.5°
	6.13 – 6.16	80.8	91.8					38°	32.2°	44°	32°	41°	32°	38°	32.2°

TIRE	Wheel Inset (Inch)	Overall Width Centerline of Tires (in)	Overall Width Outside of Tire Bulge (in)	AXLE FWD Turn Angle						AXLE BACK Turn Angle					
				Wheelbase (in)						Wheelbase (in)					
				134 - 190		191 - 230		231 - 312		134 - 190		191 - 230		231 - 312	
11R22.5 (8.25" RIMS)	5.63 – 5.73	81.7	92.7	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	80.8	91.8					39°	32.9°			43°	33°	40°	33.5°
69.92 INCH (1776 mm) AXLE WIDTH (King Pin Intersection to King Pin Intersection)															

FL941 Axle Type

TIRE	Wheel Inset (Inch)	Overall Width Centerline of Tires (in)	Overall Width Outside of Tire Bulge (in)	AXLE FWD Turn Angle						AXLE BACK Turn Angle					
				Wheelbase (in)						Wheelbase (in)					
				134 - 190		191 - 230		231 - 312		134 - 190		191 - 230		231 - 312	
445/65R22.5 (13” RIMS)	4.30	83.1	100.6	28°	23.3°	27°	23.3°	25°	22.6°	37°	28.7°	35°	28.6°	32°	28°
	5.25 – 5.30	81.1	98.6	23°	20°	22°	19.5°	21°	19.3°	33°	26.5°	31°	26°	29°	25.7°
	4.30	83.1	100	32°	25.9°	30°	25.3°	28°	25°	41°	30.7°	38°	30.4°	34°	29.4°
	5.25 – 5.30	81.1	98	27°	22.7°	26°	22.5°	25°	22.6°	36°	28.2°	34°	28°	32°	28°
445/65R22.5 (12.25” RIMS)	4.00	83.7	100.6	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	43°	33°	41°	34.1°
	4.75	82.2	98.8	29°	24°	28°	24°	27°	24.2°	37°	28.7°	35°	28.6°	33°	28.7°
385/65R22.5 (12.25” RIMS)	4.00	83.7	99.2	40°	30.2°	38°	30.4°	36°	30.8°	45°	32.4°	42°	32.5°	39°	32.8°
	4.75	82.2	97.8	35°	27.6°	34°	28°	32°	28°	45°	32.4°	41°	32°	37°	31.5°
315/80R22.5	3.12	85.5	97.8	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	44°	36°
	5.25	81.2	93.5	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	44°	36°
	5.94 – 6.04	79.7	92	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	43°	33°	39°	32.8°
	6.3	80.5	92.8	39°	29.7°	37°	29.8°	35°	30.1°	43°	31.6°	40°	31.5°	37°	31.5°
295/80R22.5 (8.25" RIMS)	5.63 – 5.73	80.3	91.8	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	79.4	90.9					39°	32.9°			43°	33°	40°	33.5°
275/70R22.5 (8.25” RIMS)	5.66 – 5.71	80.3	91.2	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	79.5	90.4	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
255/70R22.5 (8.25” RIMS)	5.66 – 5.71	80.3	90.6	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	79.4	89.8	40°	30.2°	40°	31.5°	40°	33.5°	43°	32.4	43°	34°	43°	36.5°

TIRE	Wheel Inset (Inch)	Overall Width Center-line of Tires (in)	Overall Width Out-side of Tire Bulge (in)	AXLE FWD Turn Angle						AXLE BACK Turn Angle					
				Wheelbase (in)						Wheelbase (in)					
				134 - 190		191 - 230		231 - 312		134 - 190		191 - 230		231 - 312	
12R24.5 (8.25” RIMS)	5.63 – 5.73	80.3	91.8	40°	30.2°	40°	31.5°	39°	32.9°	45°	32.4°	43°	33°	39°	32.8°
	6.13 – 6.16	79.4	90.9			37°	29.8°	35°	30.1°	40°	30.2°	37°	29.8°	35°	30.1°
12R22.5 (8.25” RIMS)	5.63 – 5.73	80.3	91.3	40°	30.2°	40°	31.5°	39°	32.9°	45°	32.4°	43°	33°	39°	32.8°
	6.13 – 6.16	79.4	90.4			38°	30.4°	35°	30.1°	43°	31.6°	40°	31.5°	37°	31.5°
11R24.5 (8.25" RIMS)	5.63 – 5.73	80.3	91.3	40°	30.2°	39°	30.9°	40°	33.5°	45°	32.4°	43°	33°	40°	33.5°
	6.13 – 6.16	79.4	90.4					38°	32.2°	44°	32°	41°	32°	38°	32.2°
11R22.5 (8.25" RIMS)	5.63 – 5.73	80.3	91.3	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	79.4	90.4					39°	32.9°			43°	33°	40°	33.5°
68.5 INCH (1739.9mm) AXLE WIDTH (King Pin Intersection to King Pin Intersection)															

Notes

FG941 Axle Type

TIRE	Wheel Inset (Inch)	Overall Width Center-line of Tires (in)	Overall Width Out-side of Tire Bulge (in)	AXLE FWD Turn Angle						AXLE BACK Turn Angle					
				Wheelbase (in)						Wheelbase (in)					
				134 - 190		191 - 230		231 - 312		134 - 190		191 - 230		231 - 312	
315/80R22.5	3.12	85.98	98.28	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	44°	36°
	5.25	81.68	93.98	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4	45°	34°	44°	36°
	5.94 – 6.04	80.18	92.48	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	43°	33°	39°	32.8°
	6.38	80.98	93.28	39°	29.7°	37°	29.8°	35°	30.1°	43°	31.6°	40°	31.5°	37°	31.5°
295/80R22.5 (8.25" RIMS)	5.63 – 5.73	80.78	92.28	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	79.88	91.38					39°	32.9°			43°	33°	40°	33.5°
275/70R22.5 (8.25” RIMS)	5.66 – 5.71	80.78	91.68	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	79.8	90.88												
255/70R22.5 (8.25” RIMS)	5.66 – 5.71	80.78	91.08	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	79.88	90.28												
12R24.5 (8.25” RIMS)	5.63 – 5.73	80.3	91.8	40°	30.2°	40°	31.5°	39°	32.9°	45°	32.4°	43°	33°	39°	32.8°
	6.13 – 6.16	79.4	90.9			37°	29.8°	35°	30.1°	40°	30.2°	37°	29.8°	35°	30.1°
12R22.5 (8.25” RIMS)	5.63 – 5.73	80.3	91.3	40°	30.2°	40°	31.5°	39°	32.9°	45°	32.4°	43°	33°	39°	32.8°
	6.13 – 6.16	79.4	90.4			38°	30.4°	35°	30.1°	43°	31.6°	40°	31.5°	37°	31.5°
11R24.5 (8.25" RIMS)	5.63 – 5.73	80.3	91.3	40°	30.2°	39°	30.9°	40°	33.5°	45°	32.4°	43°	33°	40°	33.5°
	6.13 – 6.16	79.4	90.4					38°	32.2°	44°	32°	41°	32°	38°	32.2°
11R22.5 (8.25" RIMS)	5.63 – 5.73	80.3	91.3	40°	30.2°	40°	31.5°	40°	33.5°	45°	32.4°	45°	34°	45°	36.5°
	6.13 – 6.16	79.4	90.4					39°	32.9°			43°	33°	40°	33.5°
69 INCH (1752.6mm) AXLE WIDTH AXLE WIDTH (King Pin Intersection to King Pin Intersection)															

VOLVO Rear Suspension

Single Axle Rear Suspension

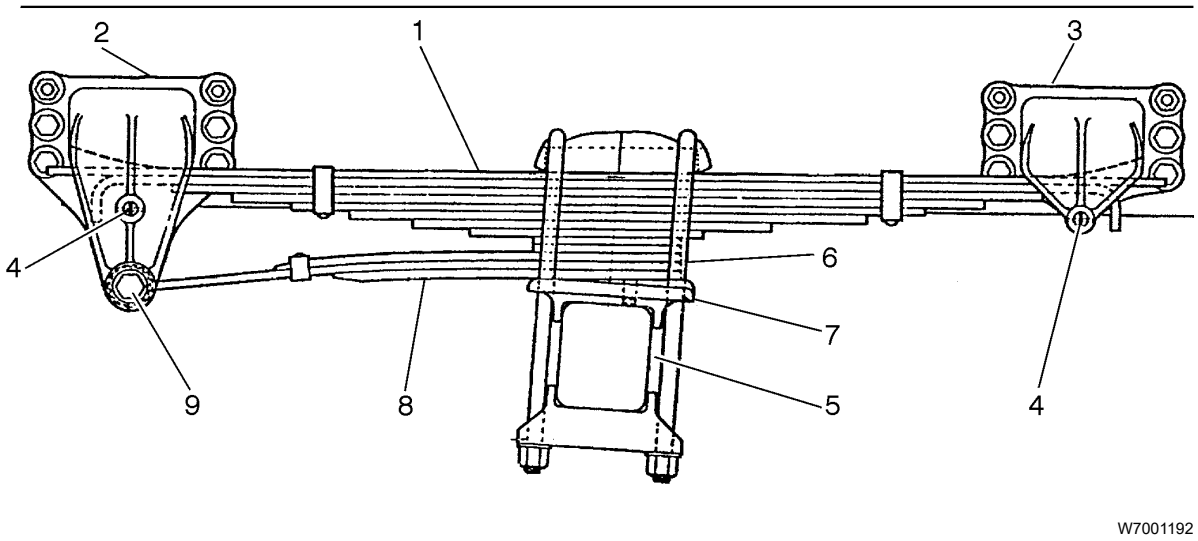

Fig. 1 Typical 4 x 2 Leaf Spring Rear Suspension

1 Leaf Spring Assembly
2 Front Spring Hanger
3 Rear Spring Hanger
4 Pin
5 Axle Housing
6 U-Bolts
7 Spring Pad
8 Radius Leaf Spring
9 Replaceable Bushing and Pin

Single axle rear suspensions consist of variable flat leaf springs with leaf-type radius rods. Variable rate springs provide superior ride characteristics, under both empty and loaded conditions because, as the load increases, the effective spring length decreases, making the spring stiffer. Replaceable polymer web blocks on the contact points between the springs and the spring brackets eliminate the possibility of wear of the spring hangers. In addition, replaceable hard steel blocks eliminate lateral wear of the spring hanger.

The leaf-type radius rods are attached to the spring brackets using a 2–bolt mount. This permits easy and accurate alignment of the rear axle using shims.

Auxiliary springs are available as an option on most models. They are recommended for off-highway applications or to provide additional stability with high center of gravity loads. It is not recommended that these auxiliary springs be used to increase load-carrying capacity.

Progressive Rate Springs

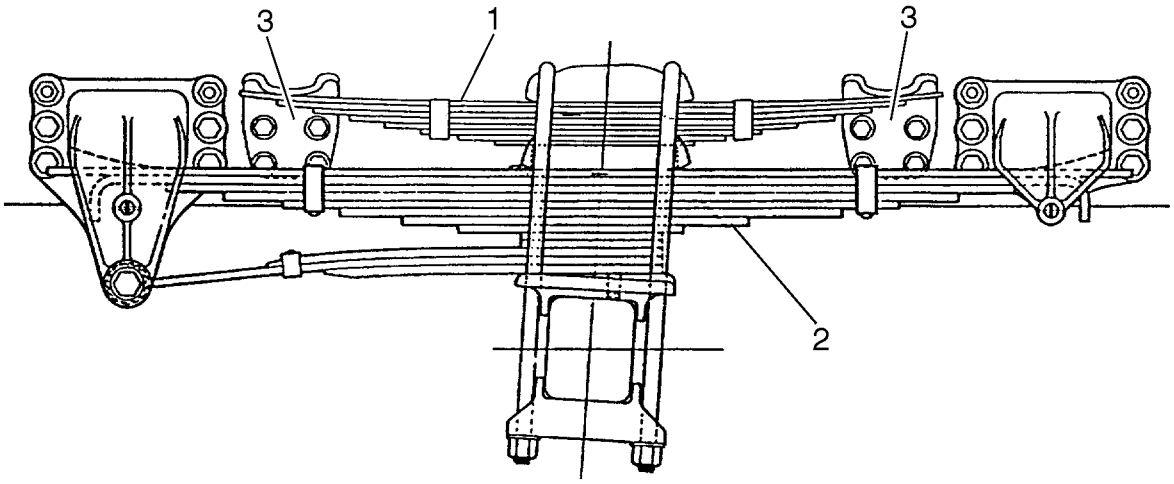

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Fig. 2 Progressive Rate VOLVO 4 x 2 Rear Springs

1 Helper Spring
2 Main Spring
3 Frame Bracket

Conventional progressive rate (double) springs are used only on vehicles with single rear axles. Double leaf springs consist of a helper spring (1) located above a main spring (2). The helper spring has a sliding attachment which contacts a frame bracket (3), which provides the progressive spring characteristic. The helper spring works only when the vehicle is loaded.

4 x 2 with Leaf Springs

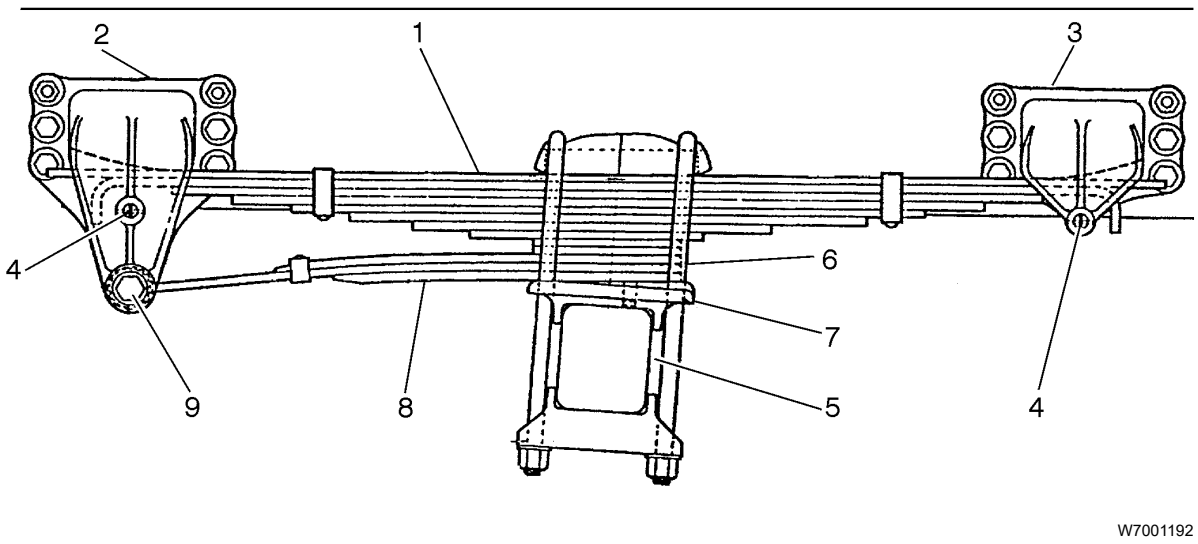


Fig. 3 Typical 4 x 2 Leaf Spring Rear Suspension

1 Leaf Spring Assembly
2 Front Spring Hanger
3 Rear Spring Hanger
4 Pin
5 Axle Housing
6 U-Bolts
7 Spring Pad
8 Radius Leaf Spring
9 Replaceable Bushing and Pin

The leaf spring assembly (1) on the single axle suspension configuration is anchored to the frame by a front (2) and rear (3) hanger bracket. Unlike front springs, this type of spring does not use a spring eye bushing. The spring has a hook on each end and rests on a pin and delron pad (4). The spring is anchored to the rear axle housing (5) via U-bolts (6) and rests on a spring pad (7). A radius leaf spring (8) is used as part of the spring assembly to absorb the torque action caused by the rear axle. The eye end of the radius leaf is anchored to the front spring bracket with a replaceable bushing and pin (9).

Tire Jounce, 4 x 2 Series

Frame Rail Height mm (in.)						
Suspension Capacity (lb)	266 (10.47)			300 (11.81), (VHD)		
	X Loaded	W Light	Y	X Loaded	W Light	Y
22,500	688 (27.1)	772 (30.4)	123 (4.8)	713 (28.1)	797 (31.4)	64 (2.5)
25,500	N/A	N/A	N/A	731 (28.8)	818 (32.2)	84 (3.3)
28,500						
31,500						

VOLVO 4 x 2 (Bartuska)

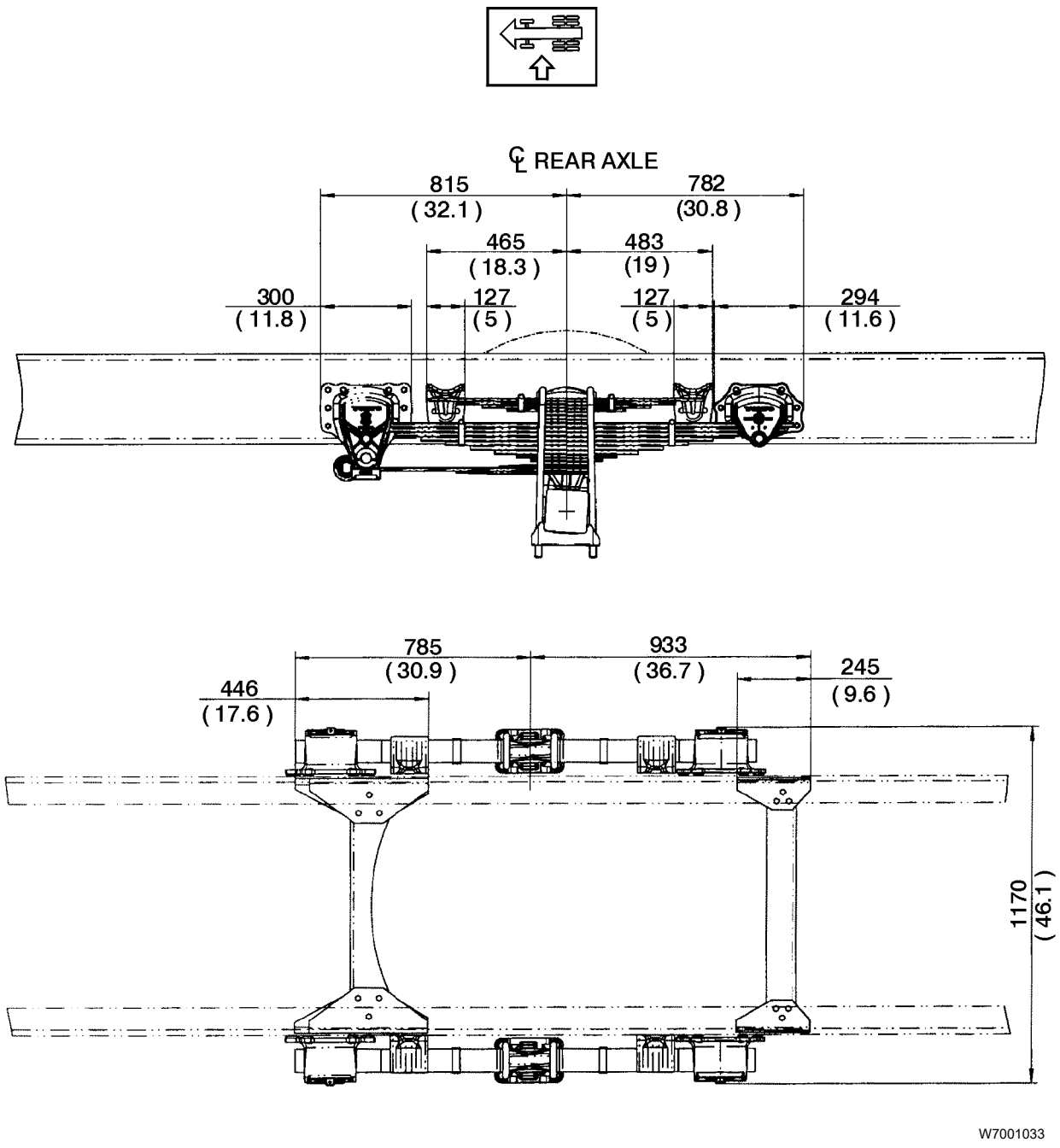
Model		VOLVO 4 x 2 (Bartuska)			
Capacity (lb)		22,500	25,500	28,500	31,500
Main Spring Type		Multileaf			
Helper Spring Type		—	Multileaf		
Width of Leaf		76.2 mm (3.0 in.)			
Number of Leaves @ Leaf Thickness	Helper Spring	—	7 @ 9.1 mm (0.358 in.)		
	Main Spring	7 @ 15 mm (0.591 in.) 2 @ 11.5 mm (0.449 in.) 1 @ 12.7 mm (0.500 in.)			
	Radius Spring	2 @ 9.1 mm (0.358 in.) 1 @ 11.4 mm (0.449 in.)			
Capacity @ Pad, Each (lb)		10,000	11,500	13,000	14,500
Deflection Rate (lb/in.)	Main Spring	3.900			
	with Helper Spring Engaged1	—	8,260		
Spring Stack Height (in.)		170 mm (6.69 in.)	233 mm (9.17 in.)		
Weight of Complete Suspension2 (lb)		659	804	809	
Shock Absorbers		N/A			
Suspension Jounce (Metal to Metal)		63.5 mm (2.50 in.)			
Creep Rating		N/A**3**			
Vehicle Models		VN, VHD	VHD		
Axle Models		23080, 23105, RS-23-160/ 161, RS-23-186	26105, RS-26-185	30105, RS-30-185	

1 Helper spring contact at 6,500 lb main spring load.

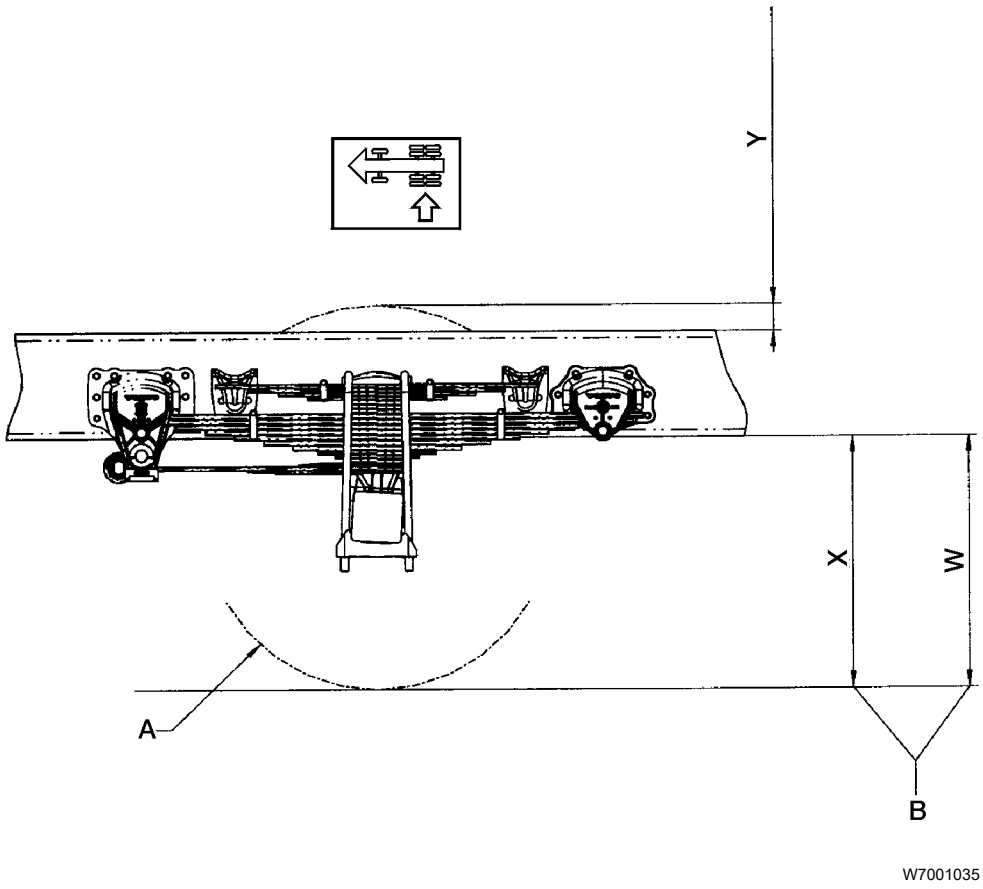
2 Including crossmembers (QTY - 2)

3 No creep rating available. Vehicles with single rear drive axles using liftable auxiliary axles will require that a rear suspension and rear axle (as well as other vehicle components) be specified with sufficient load-carrying capacity to support the actual full vehicle load when the auxiliary axle is lifted (unloaded).

Notes



VOLVO 4 x 2 (Bartuska), Side and Top Views



VOLVO 4 x 2 (Bartuska), Tire Jounce

A See “Tire Radius, VOLVO 4 x 2 (Bartuska)”, page 13 .

B At centerline of rear axle (based on noted tires).

X Loaded; ± 10 mm (0.4 in); see “Tire Jounce, 4 x 2 Series”, page 10 .

W Light; ± 10 mm (0.4 in); see “Tire Jounce, 4 x 2 Series”, page 10 .

Y Metal-to-metal tire jounce; ± 10 mm (0.4 in.); see “Tire Jounce, 4 x 2 Series”, page 10 .

Tire Radius, VOLVO 4 x 2 (Bartuska)

A	Tire Size	Loaded Radius		Light Radius		Overall Diameter		Reference Tire Type
		mm	in.	mm	in.	mm	in.	
22,500 lb	11R22.5	488	19.2	517	20.4	1050	41.3	Michelin XZE
25,500 lb	315/80R22.5	506	19.9	538	21.2	1091	43.0	Michelin XDY-1
28,500 lb								
31,500 lb								

VOLVO 6 x 4 (T-Ride)

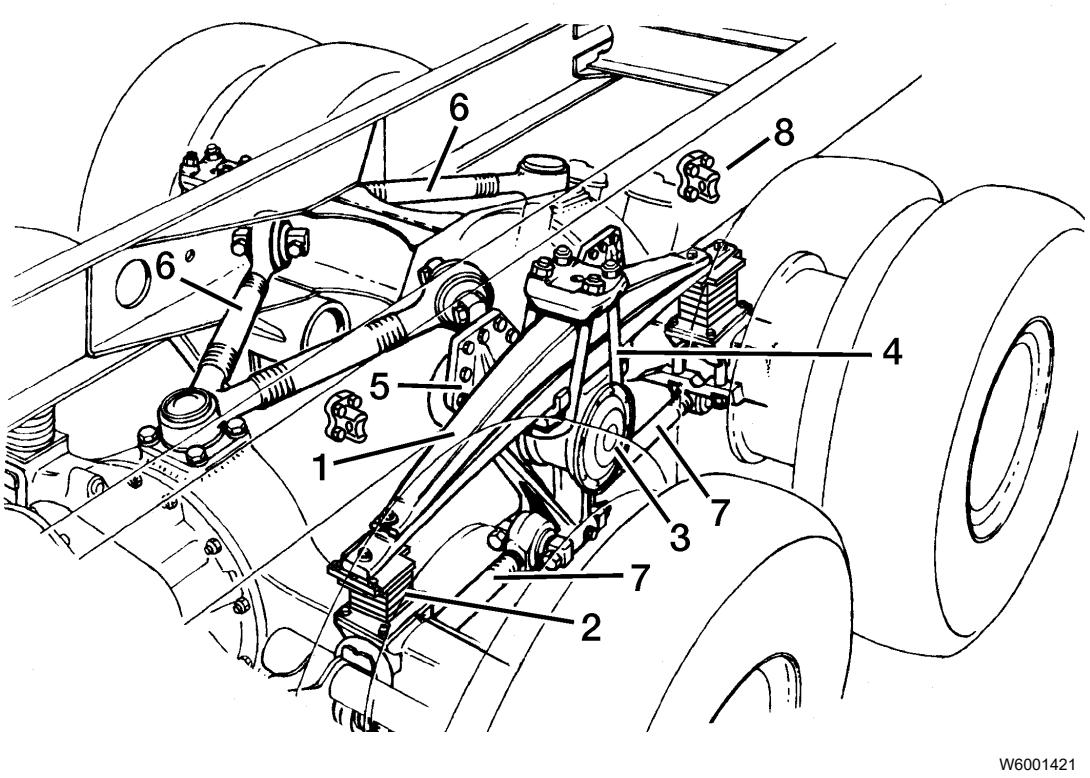


Fig. 4 Rear Suspension 6 x 4 (T-Ride)

1 Parabolic Tapered Springs
2 Rubber Cushions
3 Cradle
4 U-bolt
5 Saddle Bracket
6 Upper V-torque Rod
7 Lower Torque Rods
8 Axle Stop

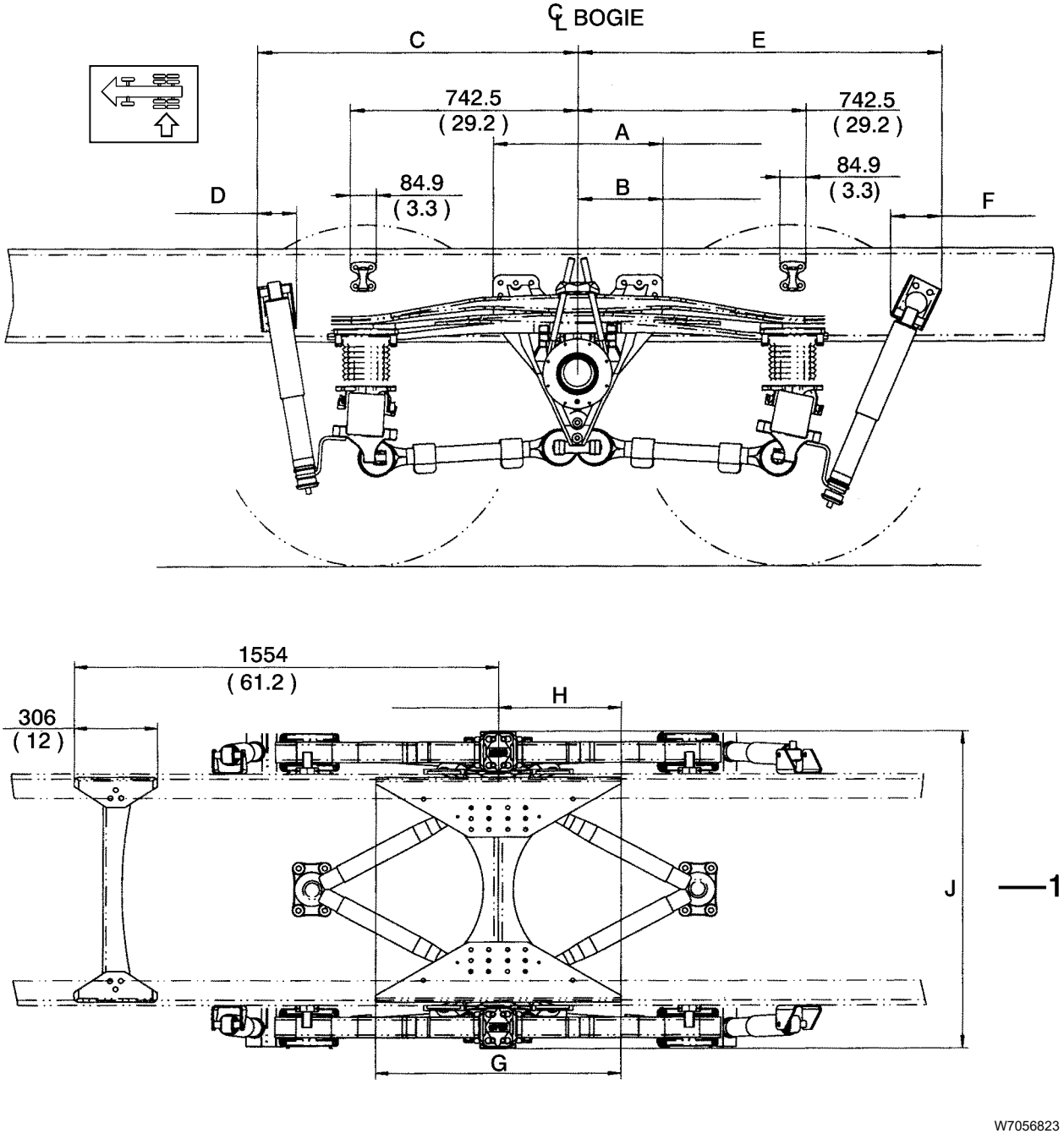
The VOLVO T-Ride tandem suspension is designed for use in both on- and off-highway applications. It offers maximum articulation for traction.

Vehicles equipped with T-Ride suspension have considerable lateral stability, making them well suited to construction or heavy-duty work applications. This stability is due to the stiff springs as well as a high suspension roll center and a greater distance between spring centers. The parabolic tapered springs (1) are mounted upside down outside the frame rail; see Fig. 3 on page 14 . The springs are attached to the two rear axles with rubber cushions (2) which absorb shock and vibrations from the axles (thereby minimizing suspension wear). Chains inside the cushions limit their extension.

The springs are anchored to the frame by a cradle (3) and U-bolts (4) to allow for motion between the two axles.

This suspension is equipped with torque rods to help maintain axle alignment. The upper V rods (6) are attached to the top of the rear axle housing and to the frame. The V rods distribute laterally transmitted forces, as well as any starting and braking torques. The four lower torque rods (7) are adjustable to align the rear axles; these are also used to transfer starting and braking torques from the rear axles to the frame.

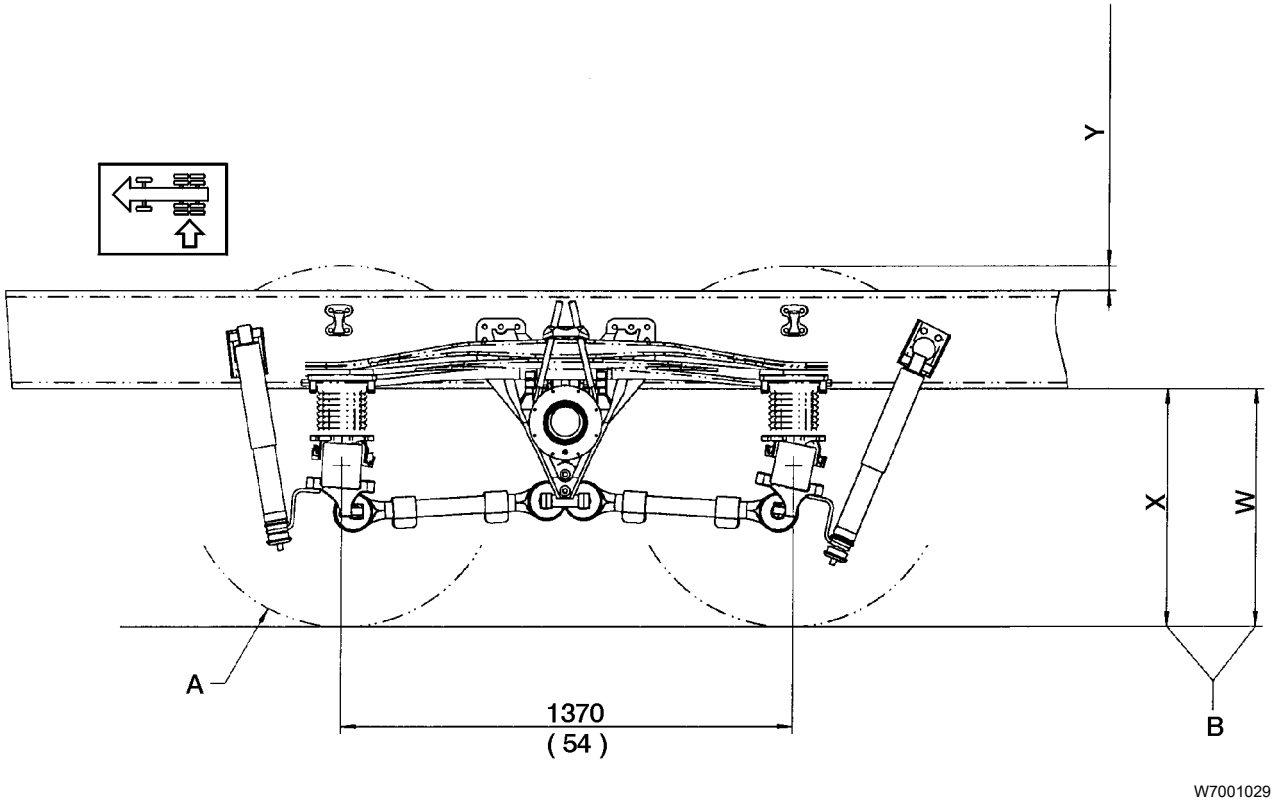
VOLVO T-Ride (38,000-46,000)



VOLVO T-Ride (38,000-46,000), Side and Top Views

A, B, C, D, E, F, G, H, J: See “Bogie Spread, VOLVO T-Ride (38,000-46,000)”, page 18 .

1 Based on 850 mm frame width



VOLVO T-Ride (38,000 - 46,000), Tire Jounce

A See “Tire Jounce, T-Ride Series”, page 19 .

B At centerline of rear axle (based on noted tires).

X Loaded; ± 10 mm (0.4 in.); see “Tire Jounce, T-Ride Series”, page 19 .

W Light; ± 10 mm (0.4 in.); see “Tire Jounce, T-Ride Series”, page 19 .

Y Metal-to-metal tire jounce; ± 10 mm (0.4 in.); see “Tire Jounce, T-Ride Series”, page 19 .

Notes

Model		VOLVO T-Ride			
Capacity (lb)		38,000	40,000		
Load Distribution		50-50			
Spring Type		Parabolic			
Width of Leaf		75 mm (2.95 in.)			
Number of Leaves		4	2	5	3
Leaf Thickness		31.8 mm (1.25 in.)	1 @ 51 mm (2.02 in.) 1 @ 63 mm (2.46 in.)	31.8 mm (1.25 in.)	2 @ 48 mm (1.88 in.) 1 @ 55 mm (2.17 in.)
Capacity @ Pad, Each (lb)		16,800	17,800	17,800	17,800
Deflection Rate (lb/in.)		7,400	19,500	8,550	17,900
Weight of Complete Suspension1 (lb)		1,280	1,132	1,346	22,000
V Rod Tube (OD x Wall THK)		48 mm (1.89 in.) x 5 mm (0.20 in.)			
Lower Torque Rod Tube (OD x Wall THK)	Adjustable	48 mm (1.89 in.) x 5 mm (0.20 in.) (L)			
	Fixed	48 mm (1.89 in.) x 5 mm (0.20 in.) (R)			
Spring Height		135 mm (5.3 in.)	118 mm (4.64 in.)	169 mm (6.65 in.)	143 mm (5.63 in.)
Axle Spacing		1370 mm (54 in.)			
Creep Rating		(See Chart, page 25 .)			
Suspension Jounce (Metal to Metal)		100 mm (3.94 in.)			
Rear Shock Absorbers		STD (QTY-4)	OPT (QTY-4)	STD (QTY-4)	OPT (QTY-4)
Vehicle Models		VN	VHD	VN, VHD (Tractor)	VHD
Axle Models		RT40-145/149, RT40-160/169, MT-40-14x	RT40-145/149, RT40-160/169, MT-40-14x	RT40-145/149, RT40-160/169, MT-40-14x	RT40-145/149, RT40-160/169, MT-40-14x

1 Including torque rods, brackets, and crossmembers (bogie, plus 1 forward of bogie).

Notes

Model		VOLVO T-Ride	
Capacity (lb)		44,000	46,000
Load Distribution		50-50	
Spring Type		Parabolic	
Width of Leaf		75 mm (2.95 in.)	
Number of Leaves		3	
Leaf Thickness		2 @ 48 mm (1.88 in.); 1 @ 55 mm (2.17 in.)	
Capacity @ Pad, Each (lb)		19,800	20,200
Deflection Rate (lb/in.)		17,900	
Weight of Complete Suspension1 (lb)		1,317	
V Rod Tube (OD x Wall THK)		48 mm (1.89 in.) x 5 mm (0.20 in.)	
Lower Torque Rod Tube (OD x Wall THK)	**Adjustable**	48 mm (1.89 in.) x 5 mm (0.20 in.) (L)	
	Fixed	48 mm (1.89 in.) x 5 mm (0.20 in.) (R)	
Spring Height		147 mm (5.79 in.)	
Axle Spacing		1370 mm (54 in.)	
Creep Rating		(See Chart, page 25 .)	
Suspension Jounce (Metal to Metal)		100 mm (3.94 in.)	
Rear Shock Absorbers		OPT (QTY-4)	STD (QTY-4)**2**
Vehicle Models		VHD	VHD, VN
Axle Models		RT-44-145, MT-40-14x	RT-46-160/169, RT-46-164/16H

1 Including torque rods, brackets, and crossmembers (bogie, plus 1 forward of bogie).

2 Shocks: standard for tractor, optional for truck.

3 Shocks mounted on front drive axle position only.

Bogie Spread, VOLVO T-Ride (38,000-46,000)

Bogie Spread, mm (in.)				
	38,000	**40,000**	**44,000**	**46,000**
Axle Type	ALL			
A	555 (21.9)			
B	277.5 (10.95)			
C	1045 (41.2)			
D	131 (5.2)			
E	1183 (46.6)			
F	165 (6.5)			
G	900 (35.4)			
H	450 (17.7)			
J	1116 (45.9)			

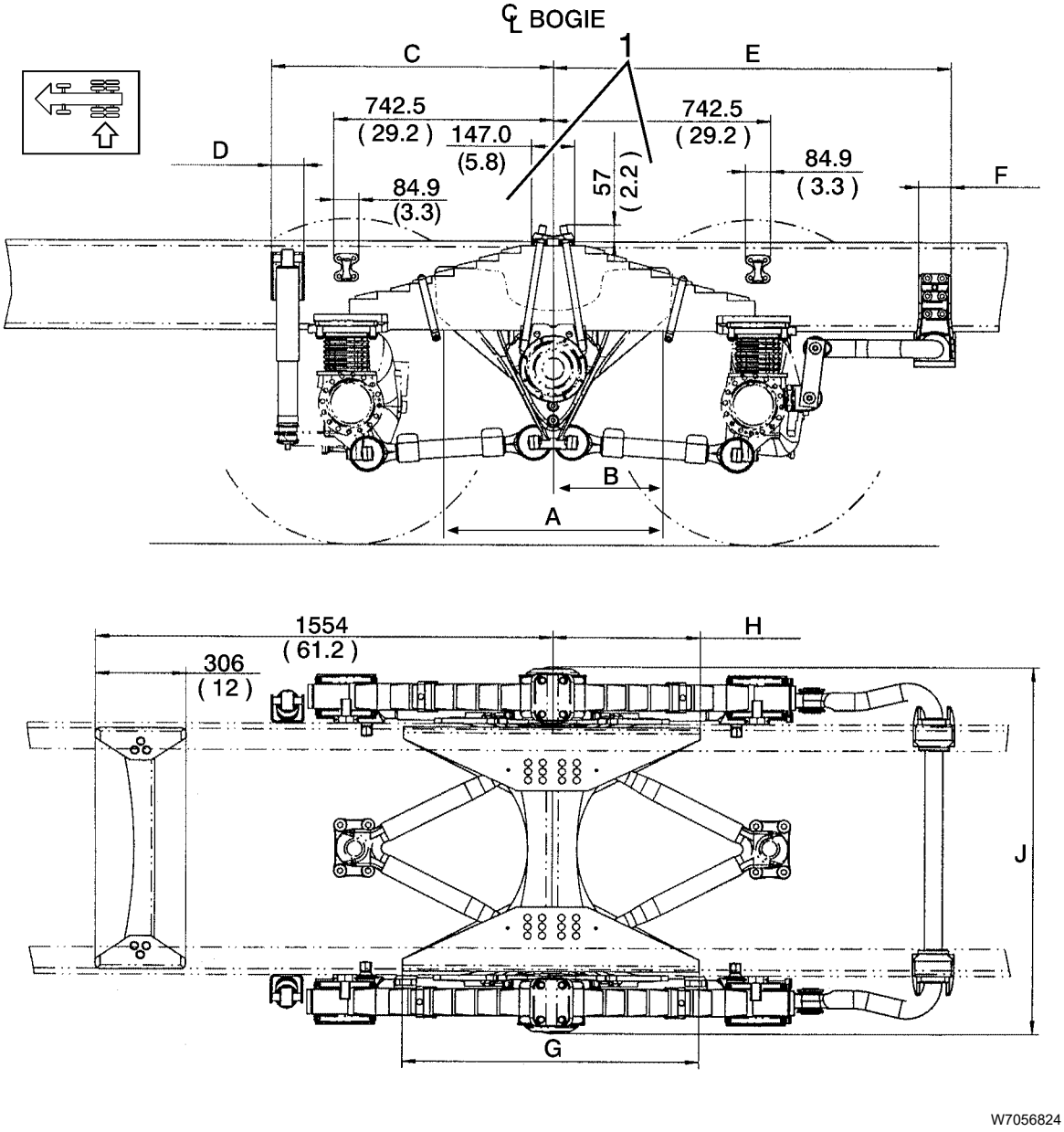
	Tire Size	Loaded Radius		Light Radius		Overall Diameter		Reference Tire Type
		mm	in.	mm	in.	mm	in.	
A	11R22.5	488	19.2	517	20.4	1050	41.3	Michelin XZE

Tire Jounce, T-Ride Series

Frame Rail Height mm (in.)							
		266 (10.47)			300 (11.81)		
		X Loaded	W Light	Y	X Loaded	W Light	Y
38,000	4-Leaf	733 (28.9)	812 (32.0)	114 (4.5)	716 (28.2)	795 (31.3)	97 (3.8)
40,000	5-Leaf						
	2-Leaf	N/A	N/A	N/A	722 (28.4)	769 (30.3)	91 (3.6)
44,000	3-Leaf						
46,000							
48,000	3-Leaf/RT2610HV				765 (30.1)	827 (32.5)	87 (3.4)
	9-Leaf						
52,000	11-Leaf/RT2610HV						
58,000	11-Leaf						
	9-Leaf/RT3210HV				758 (29.8)	829 (32.6)	94 (3.7)

Notes

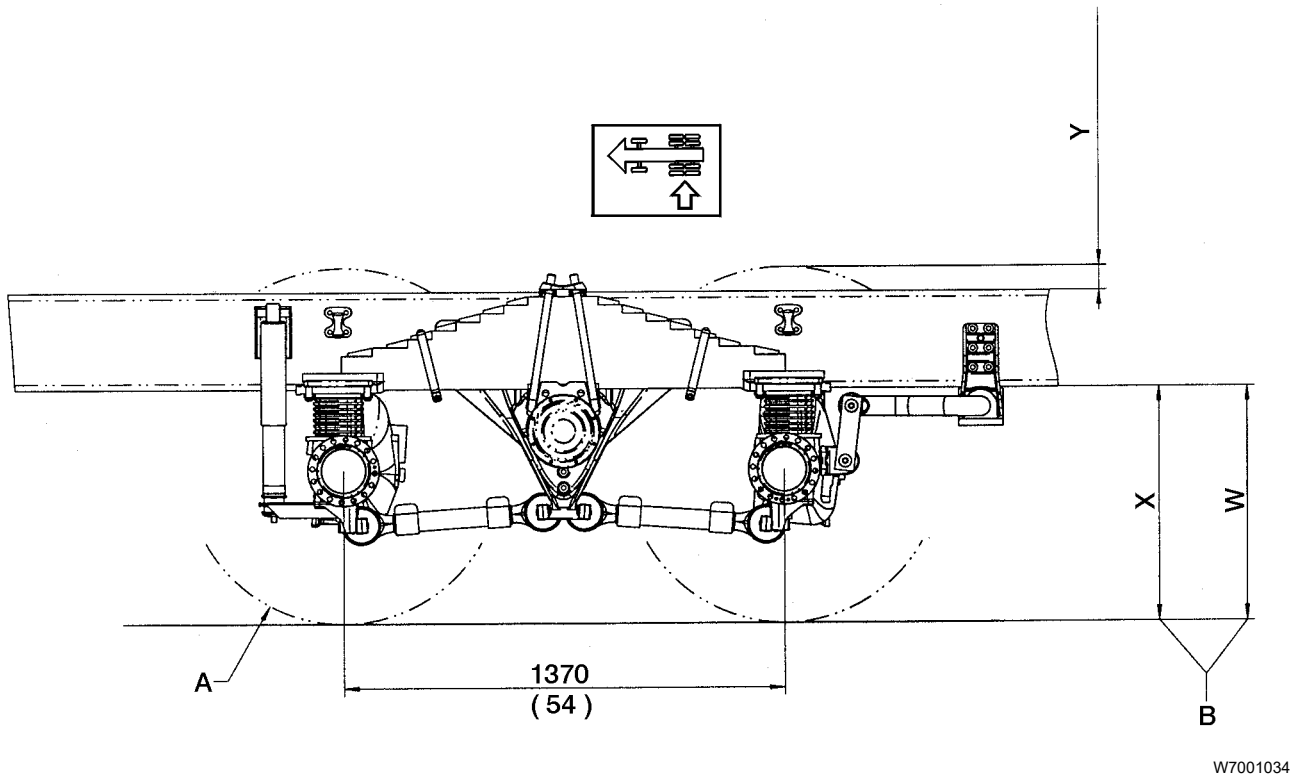
T-Ride (48,000 – 58,000)



VOLVO T-Ride (48,000 – 58,000), Side and Top Views

A, B, C, D, E, F, G, H, J: See “Bogie Spread, VOLVO T-Ride (48,000 - 58,000)”, page 24 .

1 11 – leaf, multileaf spring shown; worst case configuration shown with components projecting above top of siderails.



VOLVO T-Ride (48,000-58,000), Tire Jounce

A See “Tire Jounce, T-Ride Series”, page 19 .

B At centerline of rear axle (based on noted tires).

X Loaded; ± 10 mm (0.4 in.); see “Tire Jounce, T-Ride Series”, page 19 .

W Light; ± 10 mm (0.4 in.); see “Tire Jounce, T-Ride Series”, page 19

Y Metal-to-metal tire jounce; ± 10 mm (0.4 in.); see “Tire Jounce, T-Ride Series”, page 19 .

Notes

Model		VOLVO T-Ride		
		22	24	26
Capacity (lb)		48,000	52,000	58,000
Load Distribution		50-50		
Spring Type		Parabolic		
Width of Leaf		75 mm (2.95 in.)		
Number of Leaves		3		
Leaf Thickness		2 @ 49 mm (1.93 in.); 1 @ 55 mm (2.17 in.)		
Capacity @ Pad, Each (lb)		20,400	22,400	25,400
Deflection Rate (lb/in.)		16,100		
Weight of Complete Suspension1 (lb)		1,570		
V Rod Tube (OD x Wall THK)		58 mm (2.28 in.) x 5 mm (0.20 in.)		
Lower Torque Rod Tube (OD x Wall THK)	Adjustable	48 mm (1.89 in.) x 5 mm (0.20 in.) (L)		
	Fixed	50 mm (1.97 in.) x 6 mm (0.24 in.) (R)		
Spring Height		159 mm (6.26 in.)		
Axle Spacing		1370 mm (54 in.)		
Creep Rating		(See chart, “Rear Axle/Rear Suspension Creep Ratings (38K – 46K Tandem Axles)”, page 25 .)		
Suspension Jounce (Metal to Metal)		100 mm (3.94 in.)		
Rear Shock Absorbers		OPT (QTY-2) **2**		
Vehicle Models		VHD		
Axle Models		RT2498SM		RT2698SM
1 Including torque rods, brackets, and crossmembers (bogie, plus 1 forward of bogie).				
3 Shocks mounted on front drive axle position only.				

Notes

Model		VOLVO T-Ride		
		24	**24**	26
Capacity (lb)		48,000	52,000	58,000
Load Distribution		50-50		
Spring Type		Multileaf		
Width of Leaf		75 mm (2.95 in.)		
Number of Leaves		9	11	
Leaf Thickness		26 mm (1.02 in.)		
Capacity @ Pad, Each (lb)		24,300	28,600	
Deflection Rate (lb/in.)		14,400	17,700	
Weight of Complete Suspension1 (lb)		1,723		
V Rod Tube (OD x Wall THK)		58 mm (2.28 in.) x 5 mm (0.20 in.)		
Lower Torque Rod Tube (OD x Wall THK)	**Adjustable**	48 mm (1.89 in.) x 5 mm (0.20 in.) (L)		
	Fixed	50 mm (1.97 in.) x 6 mm (0.24) (R)		
Spring Height		234 mm (9.21 in.)	286 mm (11.26 in.)	234 mm (9.21 in.)
Axle Spacing		1370 mm (54 in.)		
Creep Rating		(See chart, “Rear Axle/Rear Suspension Creep Ratings (38K – 46K Tandem Axles)”, page 25 .)		
Suspension Jounce (Metal to Metal)		(See “Tire Jounce, T-Ride Series”, page 19 .)		
Rear Shock Absorbers		OPT (QTY-2)**2**		
Vehicle Models		VHD	VHD	VHD
Axle Models		RT2498SM		RT2698SM
1 Including torque rods, brackets, and crossmembers (bogie, plus 1 forward of bogie).				
2 Shocks mounted on front drive axle position only.				

Notes

Sales Code	Suspension Load	Number of Leafs	Spring Width	VHD Only	U Bolt Length	Dimension 1 (Above Top of Rail)
350-381	48K	3-Leaf Parabolic	75 mm (2.95 in.)	Truck/Tractor	400 mm	22 mm (1 in.)
350-383	52K					
350-389	58K					
350-382	48K (22)	9-Leaf Multi-Leaf		Truck/Tractor	400 mm	22 mm (1 in.)
350-384	52K (24)	11-Leaf Multi-Leaf			445 mm	58 mm (2.28 in.)
350-386	58K (26)					

Bogie Spread, VOLVO T-Ride (48,000 - 58,000)

Bogie Spread, mm (in.)			
	48,000	52,000	58,000
Axle Type	RT2498SM		RT2698SM
A	706 (27.8)		
B	353 (13.9)		
C	1036 (40.8)	957 (37.7)	
D	119 (4.7)	112 (4.4)	
E	1354 (53.3)		
F	110 (4.3)		
G	1010 (39.8)		
H	505 (19.9)		
J	1241.4 (49.3)		

	Tire Size	Loaded Radius		Light Radius		Overall Diameter		Reference Tire Type
		mm	in.	mm	in.	mm	in.	
A	315/80R22.5	506	19.9	538	21.2	1091	43.0	Michelin XDY-1

Rear Axle/Rear Suspension Creep Ratings (38K – 46K Tandem Axles)

Rear Suspension Type		Suspension Creep Rating (lb)	Rear Axle Type/Rear Axle Creep Rating (lb) / 38K - 46K Tandem Axles (see "Creep Rating:", page 26)									
			40,000 lb				**44,000 lb**		**46,000 lb**			
			Meritor RT-40-145/ 149	Meritor RT-40-160/ 169	Dana D405	Dana DS40	Meritor RT-44-145	Dana DH44	Meritor RT-46-160/ 169	Meritor RT-46-164/ 16H	Dana D462P	Dana 463P
			55,000	55,000	58,000	60,000	55,000	62,000	60,000	60,000	62,000	64,000
(B-Ride/ 38K)	(4-Leaf Spring)	Not Available	NO AUXILIARY AXLES PERMITTED									
(B-Ride/ 40K)	(5-Leaf Spring)	50,000	50,000[1]	50,000[1]	50,000[1]	50,000[1]						
			2P or 1T[2]	2P or 1T[2]	2P or 1T[2]	2P or 1T[2]						
	(2-Leaf Spring)	55,000	55,000[1]	55,000[1]	55,000[1]	55,000[1]						
			3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]						
	(3-Leaf Spring)	60,000	55,000[1]	58,000[1]	55,000[1]	60,000[1]						
			3P or 1P1T[2]	3P or 1P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]						
(B-Ride/ 44K)	(3-Leaf Spring)	60,000					55,000[1]	60,000[1]				
							3P or 1P1T[2]	3P or 1P1T[2]				
(B-Ride/ 46K)	(3-Leaf Spring)	60,000							60,000[1]	60,000[1]	60,000[1]	60,000[1]
									3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]
Hendrickson RT 403 (40,000 lb)		55,000	55,000[1]	55,000[1]	55,000[1]	55,000[1]						
			3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]						
Hendrickson RT 403 (40,000 lb)		60,000					55,000[1]	60,000[1]	60,000[1]	60,000[1]	60,000[1]	60,000[1]
							3P or 1P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]
Hendrickson RT 463 (46,000 lb)		55,000	55,000[1]	55,000[1]	55,000[1]	55,000[1]						
			3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]						
Hendrickson HN 402/HMX 400 (40,000 lb)		60,000					55,000[1]	60,000[1]	60,000[1]	60,000[1]	60,000[1]	60,000[1]
							3P or 1P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]
Hendrickson HN 462/HMX 460 (46,000 lb)		50,000	50,000[1]	50,000[1]	50,000[1]	50,000[1]						
			2P or 1P1T[2]	2P or 1P1T[2]	2P or 1P1T[2]	2P or 1P1T[2]						

		Rear Axle Type/Rear Axle Creep Rating (lb) / 38K - 46K Tandem Axles (see “Creep Rating:”, page 26)									
		40,000 lb				44,000 lb		46,000 lb			
Rear Suspension Type	Suspension Creep Rating (lb)	Meritor RT-40-145/ 149	Meritor RT-40-160/ 169	Dana D405	Dana DS40	Meritor RT-44-145	Dana DH44	Meritor RT-46-160/ 169	Meritor RT-46-164/ 16H	Dana D462P	Dana 463P
		55,000	55,000	58,000	60,000	55,000	62,000	60,000	60,000	62,000	64,000
Hendrickson HAS (44,000 lb)	50,000					50,000[1]	50,000[1]				
						2P or 1P1T[2]	2P or 1P1T[2]				
Hendrickson HAS (46,000 lb)	50,000							50,000[1]	50,000[1]	50,000[1]	50,000[1]
								2P or 1P1T[2]	2P or 1P1T[2]	2P or 1P1T[2]	2P or 1P1T[2]

[1]Suspension/axle combination creep rating (lb).

[2]Number of auxiliary axles allowed: 3P = 3 pushers or less; 2P = 2 pushers or less 1T = 1 tag; 2P1T = 2 pushers & 1 tag or less; 1P1T = 1 pusher & 1 tag or less

Creep Rating:

(See chart, “Rear Axle/Rear Suspension Creep Ratings (38K – 46K Tandem Axles)” on page 25 .)

- For off-highway (work site) with auxiliary axles lifted at MAXIMUM SPEED of 5 miles per hour.
- This condition should not exceed 5% of total operating miles of the vehicle.
- For standard track rear axle housings only.
- For dual tire configuration only.

Note: Creep ratings for the rear axle and rear suspension are from the respective manufacturer's published data; additional requirements per rear axle and/or rear suspension supplier may be required.

Note: Creep ratings (per chart on page 25) are for rear axles/rear suspensions only. They do not take into account other vehicle components (i.e., brakes, wheel equipment, frame, etc.)

Note: The following vehicles are approved ONLY for use with one (1) auxiliary axle, regardless of creep rating:

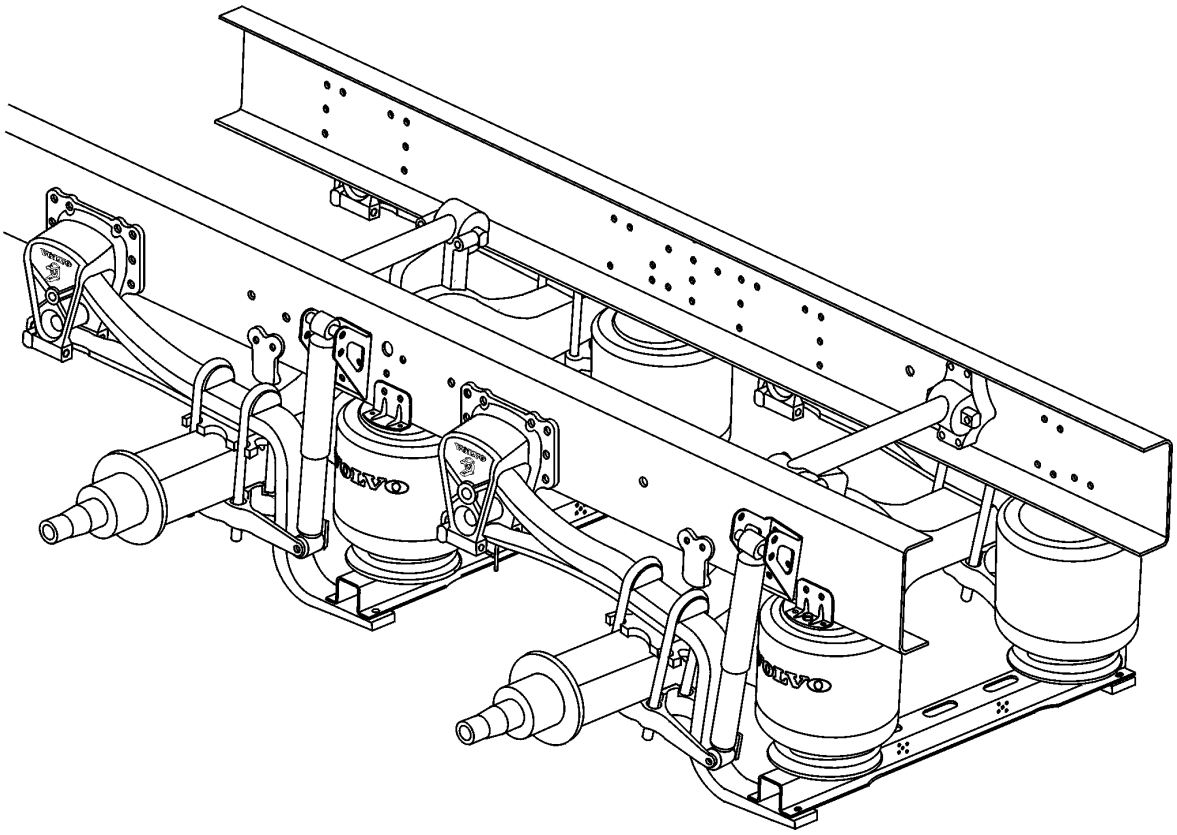
- Vehicles designated for TRACTOR application; and
- Vehicles equipped with a liftable non-steer auxiliary axle.

Any deviations outside of these parameters will require prior approval on a per-vehicle order basis.

CAUTION

CREEP RATINGS CANNOT BE EXCEEDED! Operators using vehicles equipped with liftable auxiliary axles must consider these creep ratings when any liftable auxiliary axle is unloaded. The auxiliary axles should only be lifted (unloaded) to improve vehicle maneuverability in off-road use or when the vehicle is unloaded.

VOLVO Air Suspension



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The design of the Air-Ride Suspension has been refined by Volvo Trucks North America. The result of this refinement process is the VOLVO Optimized Air Suspension. This new suspension is a rear air suspension with improved ride characteristics and increased durability.

⚠ CAUTION

The VOLVO Optimized Air Suspension is set at the factory. Changing the ride height will affect the driveshaft angles and may cause driveline vibration and/or shorten component life.
Ride height adjustments must be performed in accordance with all documented service procedures.

Hendrickson Axle Suspension

Specifications

Model	Hendrickson			
	RT403	RT463	HH	HH
Capacity (lb)	40,000	46,000	40,000	46,000
Load Distribution	50-50			
Spring Type	Steel		Rubber	
Width of Spring	65 mm (4 in.)			
Number of Leaves	10	13		
Leaf Thickness	14.173 mm (0.558 in.)			
Capacity @ Pad, Each (lb)	18,000	21,000	18,000	21,000
Deflection Rate (lb/in.)	15,600	20,700		
Weight of Complete Suspension (lb)	1.3432	1.4842	8611	
Beam Center Bushing Material	RUBBER	BRONZE	N/A	
Spring Height, mm (in.)	141.7 (5.58)	184.2 (7.25)	N/A	
Transverse Torque Rod	OPTIONAL		STANDARD	STANDARD
Axle Spacing, Standard	54			
Axle Spacing, Optional	60			60, 72.5
Rear Shock Absorbers	NOT AVAILABLE		STANDARD	
Creep Rating	(See chart, “Rear Axle/Rear Suspension Creep Ratings (38K – 46K Tandem Axles)”, page 34 .)			
Suspension Jounce (Metal-to-Metal)	5.00			
GCW	160,000	190,000	160,000	190,000
GVW	73,000	80,000	73,000	80,000
Vehicle Models	VHD		VHD	
Axle Models	D405, DS40, MT-40-A14*D, RT-40-145/149, RT-40-160/169	DH444, D462P, D463P, MT-44-A145D, RT-44-1454, RT-46-160/169, RT-46-164/16H	D405, DS40, D40-170 MT-40-A14*D, RT-40-145/149, RT-40-160/169	DH444, D46-170, MT-44-A145D, RT-44-1454, RT-46-160/169, RT-46-164/16H

1 Includes torque rods, brackets, and crossmembers (bogie, plus 1 forward of bogie).

2 Does not include weight for optional transverse torque rods; add 44 kg (97 lb) for RT403; add 10.5 kg (23 lb) for RT463.

3 RT463 with transverse torque rod requires rubber center bushings in place of bronze center bushings.

4 Suspension capacity derated to 44,000 lb when used with these axles.

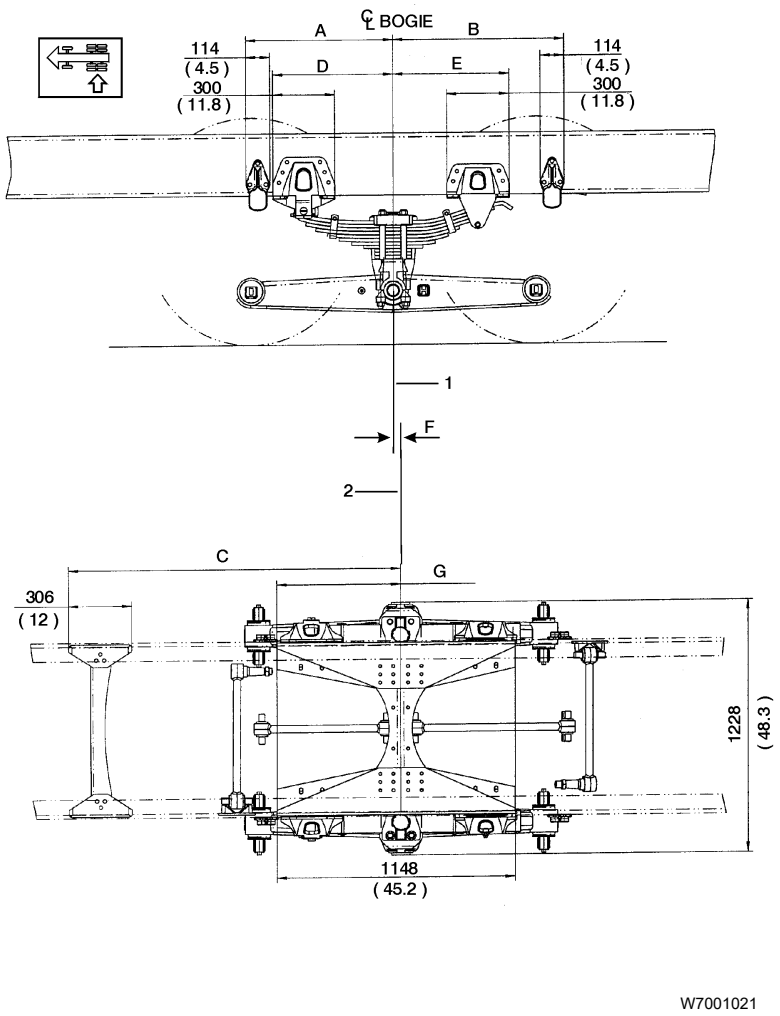


Fig. 5 Hendrickson RT403/463, Side and Top Views

1 Bogie centerline

2 Crossmember centerline

A, B, C, D, E, F, G: See the below “Bogie Spread, RT403/463 Side and Top Views” table.

Bogie Spread, RT403/463 Side and Top Views

	Bogie Spread, RT403/463, mm (in.)	
	1370 (54)	**1524 (60)**
A	724 (28.5)	798 (31.4)
B	794 (31.3)	872 (34.3)
C	1604 (63.1)	1652 (65.0)
D	582 (22.9)	
E	556 (21.9)	
F	0	25.4 (1.0)
G	548 (21.6)	600 (23.6)

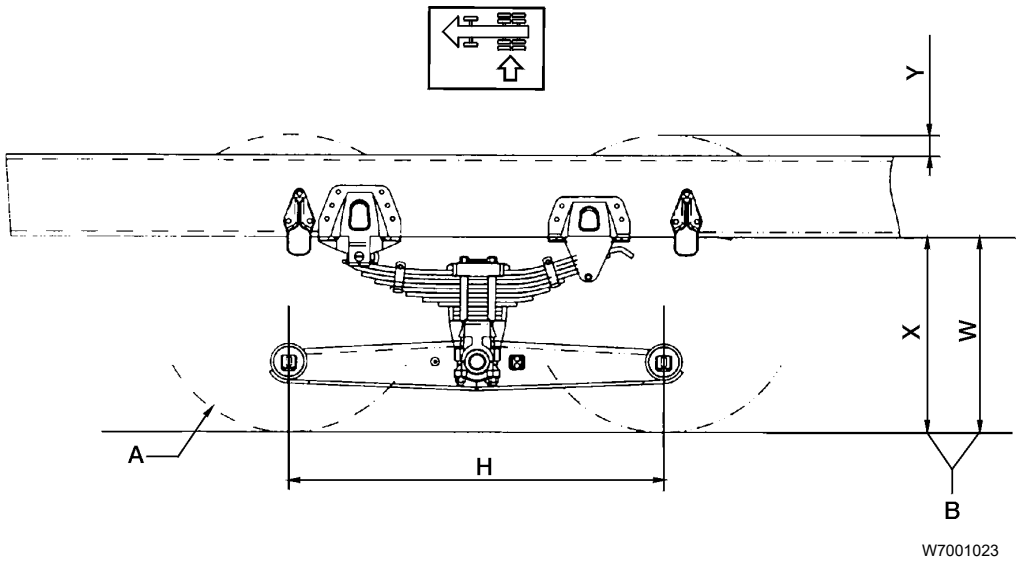


Fig. 6 Hendrickson RT403/463, Tire Jounce

A See the below “Tire Radius, Hendrickson RT403/463” table.

B At centerline of rear axle (based on noted tires).

H1 Bogie Spread (see the below “Bogie Spread, Hendrickson RT403/463” table.

X Loaded; ± 10 mm (0.4 in.).

W Light; ± 10 mm (0.4 in.)

Y Metal-to-metal tire jounce; ± 10 mm (0.4 in.)

Tire Radius, Hendrickson RT403/463

	Tire Size	Loaded Radius		Light Radius		Overall Diameter		Reference Tire Type
		mm	in.	mm	in.	mm	in.	
A	11R22.5	488	19.2	517	20.4	1050	41.3	Michelin XZE

Bogie Spread, Hendrickson RT403/463

Bogie Spread		
H1	1370 mm (54 in.)	1524 mm (60 in.)
1 Measured at suspension beam end centers. Add 25.4 mm (1.0 in.) for center of tire to tire spacing.		

	X Loaded		W Light		Y	
	mm	in.	mm	in.	mm	in.
RT403	738	29.1	798	31.4	102	4.0
RT463	741	29.2	805	31.7	99	3.9

Hendrickson HAS Air Suspension

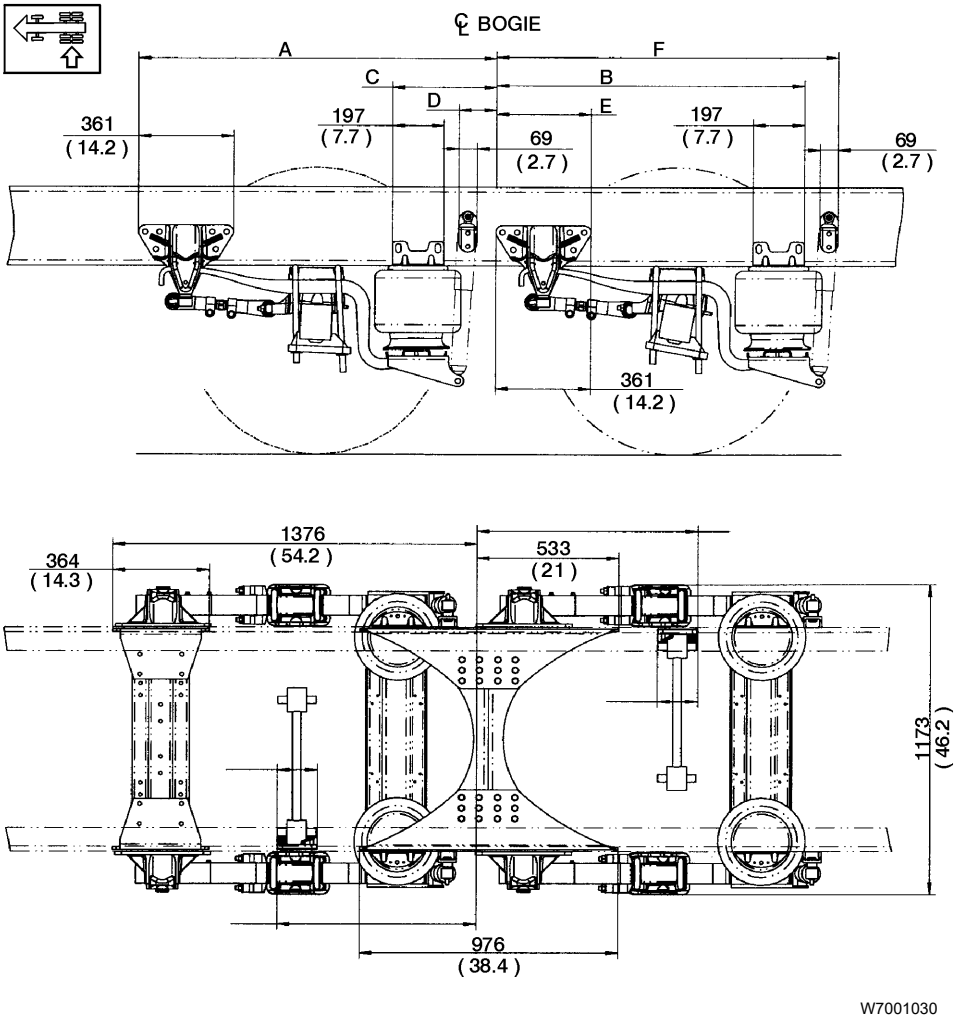


Fig. 7 Hendrickson HAS Air, Side and Top Views

A, B, C, D, E, F: See the below “Bogie Spread: HAS Air, Side, and Top Views” table.

Bogie Spread: HAS Air, Side, and Top Views

	Bogie Spread, HAS, mm (in.)	
	1370 (54)	**1524 (60)**
A	1366 (53.8)	1441 (56.8)
B	1172 (46.1)	1247 (49.1)
C	397 (15.6)	472 (18.6)
D	143 (5.6)	218 (8.6)
E	359 (14.1)	434 (17.1)
F	1299 (51.1)	1374 (54.1)

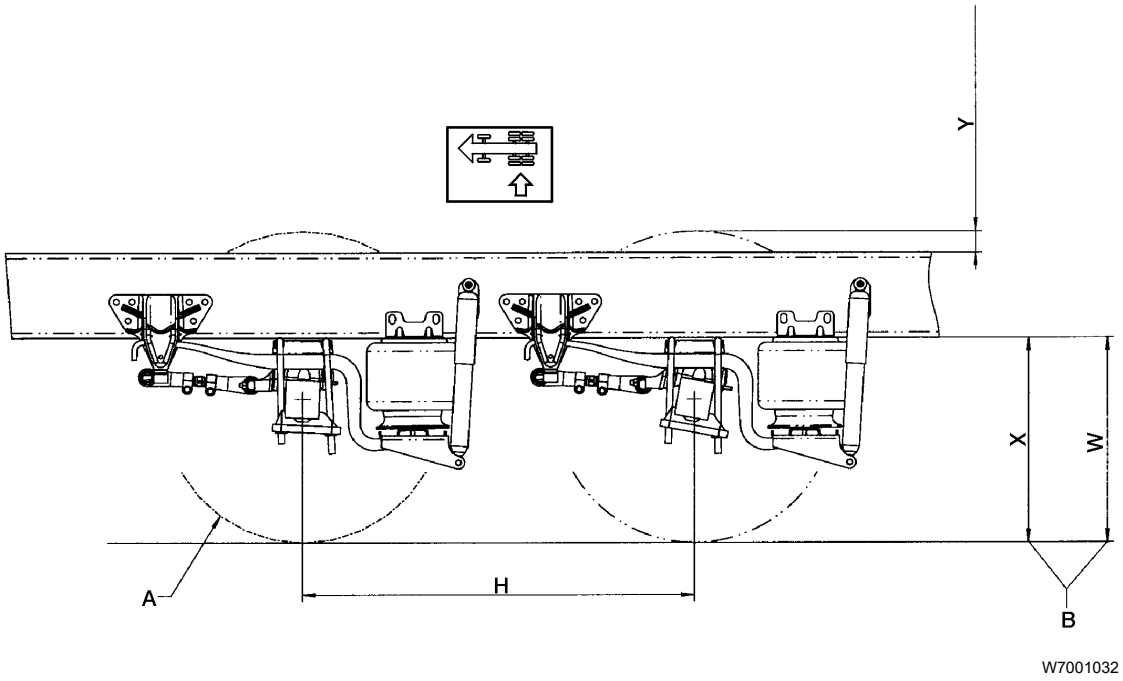


Fig. 8 Hendrickson HAS, Tire Jounce

A See the below “Tire Radius, Hendrickson HAS” table.

B At centerline of rear axle (based on noted tires).

H Bogie Spread (see the below “Bogie Spread, Hendrickson HAS” table.

X Loaded; ± 10 mm (0.4 in.).

W Light; ± 10 mm (0.4 in.).

Y Metal-to-metal tire jounce; ± 10 mm (0.4 in.).

Tire Radius, Hendrickson HAS

	Tire Size	Loaded Radius		Light Radius		Overall Diameter		Reference Tire Type
		mm	in.	mm	in.	mm	in.	
A	11R22.5	488	19.2	517	20.4	1050	41.3	Michelin XZE

Bogie Spread, Hendrickson HAS

Bogie Spread		
H	1370 mm (54 in.)	1524 mm (60 in.)

	X Loaded		W Light		Y	
HAS	mm	in.	mm	in.	mm	in.
VN	704	27.7	736	29.0	9	0.04
VHD	729	28.7	761	30.0	−16	−0.6

Model	Hendrickson						
	HAS			Primaax			
Capacity (lb)	40,000	44,000	46,000	40,000	44,000	46,000	69,000 (Tri-drive)
Load Distribution	50-50			50–50			Evenly Distributed (33/33/33)
Spring Type	Air			Air			
Width of Spring	76.2 mm (3.0 in.)			N/A			
Number of Leaves	1			N/A			
Leaf Thickness	50.8 mm (2.0 in.)			N/A			
Capacity @ Pad, Each (lb)	10,500			N/A			
Deflection Rate (lb/in.)	12,060			N/A			
Weight of Complete Suspension (lb)	9051	920 [1]	937 [1]	1,030			1,555
Axle Spacing, Standard	54			54			
Axle Spacing, Optional	60			60			
Rear Shock Absorbers	STANDARD			STANDARD			
Creep Rating	(See chart, “Rear Axle/Rear Suspension Creep Ratings (38K – 46K Tandem Axles)”, page 34 .)						
Suspension Jounce (Metal-to-Metal)	3.00			3.5			
GCW	150,000			180,000			Dependent on Axle
GVW	76,000			N/A			
Vehicle Models	VN, VHD	VHD	VN, VHD	VN, VHD	VHD	VN, VHD	VN, VHD
Axle Models	D405, DS40, RT-40-145/149, RT-40-160/169[2]	DH44, RT-44-145	D462P, D463P, RT-46-160/169, RT-46-164/16H	RT-40-145, D405, RT-40-160, D40-170, DSH-40, MT-40-14x	DH44, RT-44-145	RT-46-160, D46-170	R3S3173

1 Includes torque rods, brackets, and crossmembers (bogie, plus 1 forward of bogie).
2 D405 and RT-40-145/149 with Hendrickson HAS. Not applicable on VN.

Hendrickson Primaax

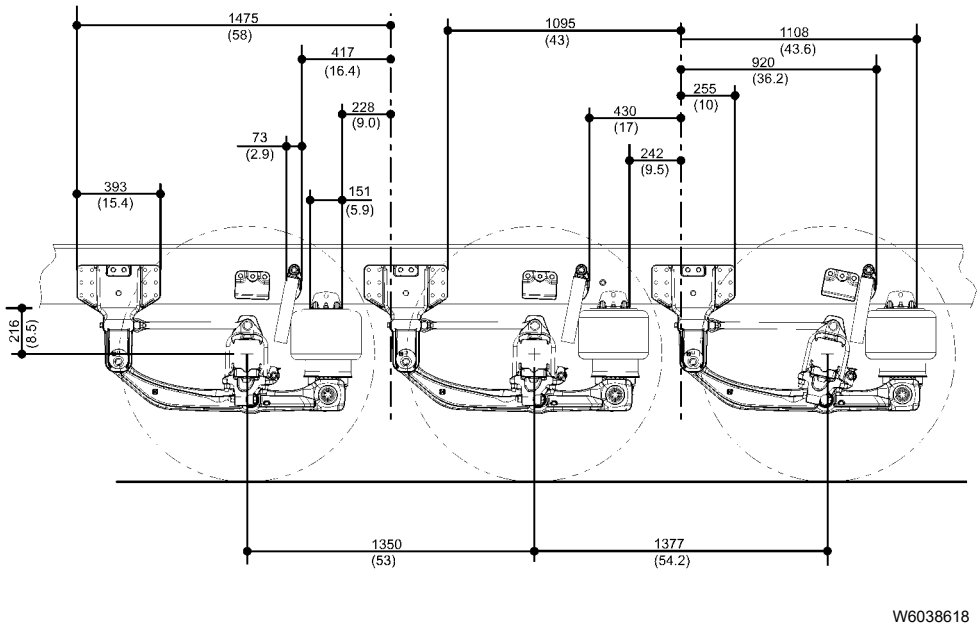


Fig. 9 Hendrickson Primaax, Side View

Rear Axle/Rear Suspension Creep Ratings (38K – 46K Tandem Axles)

			Rear Axle Type / Rear Axle Creep Rating (lb) / 38K - 46K Tandem Axles (see "Creep Rating:", page 36)									
			40,000 lb				**44,000 lb**		**46,000 lb**			
Rear Suspension Type		Suspension Creep Rating (lb)	Meritor RT-40-145/ 149	Meritor RT-40-160/ 169	Dana D405	Dana DS40	Meritor RT-44-145	Dana DH44	Meritor RT-46-160/ 169	Meritor RT-46-164/ 16H	Dana D462P	Dana 463P
			55,000	55,000	58,000	60,000	55,000	62,000	60,000	60,000	62,000	64,000
VBT38 K)	(4-Leaf Spring)	Not Available	NO AUXILIARY AXLES PERMITTED									
VBT40	(5-Leaf Spring)	50,000	50,000[1]	50,000[1]	50,000[1]	50,000[1]						
			2P or 1T[2]	2P or 1T[2]	2P or 1T[2]	2P or 1T[2]						
	(2-Leaf Spring)	55,000	55,000[1]	55,000[1]	55,000[1]	55,000[1]						
			3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]						
	(3-Leaf Spring)	60,000	55,000[1]	58,000[1]	55,000[1]	60,000[1]						
			3P or 1P1T[2]	3P or 1P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]						
VBT44	(3-Leaf Spring)	60,000					55,000[1]	60,000[1]				
							3P or 1P1T[2]	3P or 1P1T[2]				
VBT46	(3-Leaf Spring)	60,000							60,000[1]	60,000[1]	60,000[1]	60,000[1]
									3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]	3P or 2P1T[2]
Hendrickson RT 403 (40,000 lb)		55,000	55,000[1]	55,000[1]	55,000[1]	55,000[1]						
			3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]	3P or 1P1T[2]						
Hendrickson		60,000					55,000[1]	60,000[1]	60,000[1]	60,000[1]	60,000[1]	60,000[1]

		Rear Axle Type / Rear Axle Creep Rating (lb) / 38K - 46K Tandem Axles (see “Creep Rating:”, page 36)									
		40,000 lb				**44,000 lb**		**46,000 lb**			
Rear Suspension Type	Suspen-sion Creep Rating (lb)	Meritor RT-40-145/ 149	Meritor RT-40-160/ 169	Dana D405	Dana DS40	Meritor RT-44-145	Dana DH44	Meritor RT-46-160/ 169	Meritor RT-46-164/ 16H	Dana D462P	Dana 463P
		55,000	55,000	58,000	60,000	55,000	62,000	60,000	60,000	62,000	64,000
RT 403 (40,000 lb)						3P or 1P1T²	3P or 2P1T²	3P or 2P1T²	3P or 2P1T²	3P or 2P1T²	3P or 2P1T²
Hendrickson RT 463 (46,000 lb)	55,000	55,000¹	55,000¹	55,000¹	55,000¹						
		3P or 1P1T²	3P or 1P1T²	3P or 1P1T²	3P or 1P1T²						
Hendrickson HN 402 (40,000 lb)	60,000					55,000¹	60,000¹	60,000¹	60,000¹	60,000¹	60,000¹
						3P or 1P1T²	3P or 2P1T²	3P or 2P1T²	3P or 2P1T²	3P or 2P1T²	3P or 2P1T²
Hendrickson HN 462 (46,000 lb)	50,000	50,000¹	50,000¹	50,000¹	50,000¹						
		2P or 1P1T²	2P or 1P1T²	2P or 1P1T²	2P or 1P1T²						
Hendrickson PAX 462 (46,000 lb)	46,000										
Hendrickson PAX 692 (69,000 lb)	69,000										
Hendrickson HAS (40,000 lb)	50,000					50,000¹	50,000¹				
						2P or 1P1T²	2P or 1P1T²				
Hendrickson HAS (46,000 lb)	50,000							50,000¹	50,000¹	50,000¹	50,000¹
								2P or 1P1T²	2P or 1P1T²	2P or 1P1T²	2P or 1P1T²

¹Suspension/axle combination creep rating (lb).

²Number of auxiliary axles allowed: 3P = 3 pushers or less; 2P = 2 pushers or less 1T = 1 tag; 2P1T = 2 pushers & 1 tag or less; 1P1T = 1 pusher & 1 tag or less

Notes

Creep Rating:

(See chart, “Rear Axle/Rear Suspension Creep Ratings (38K – 46K Tandem Axles)” on page 34 .)

- For off-highway (work site) with auxiliary axles lifted at MAXIMUM SPEED of 5 miles per hour.
- This condition should not exceed 5% of total operating miles of the vehicle.
- For standard track rear axle housings only.
- For dual tire configuration only.

Note: Creep ratings for the rear axle and rear suspension are from the respective manufacturer's published data; additional requirements per rear axle and/or rear suspension supplier may be required.

Note: Creep ratings (per chart on page 34) are for rear axles/rear suspensions only. They do not take into account other vehicle components (i.e., brakes, wheel equipment, frame, etc.)

Note: The following vehicles are approved ONLY for use with one (1) auxiliary axle, regardless of creep rating:

- Vehicles designated for TRACTOR application; and
- Vehicles equipped with a liftable non-steer auxiliary axle.

Any deviations outside of these parameters will require prior approval on a per-vehicle order basis.

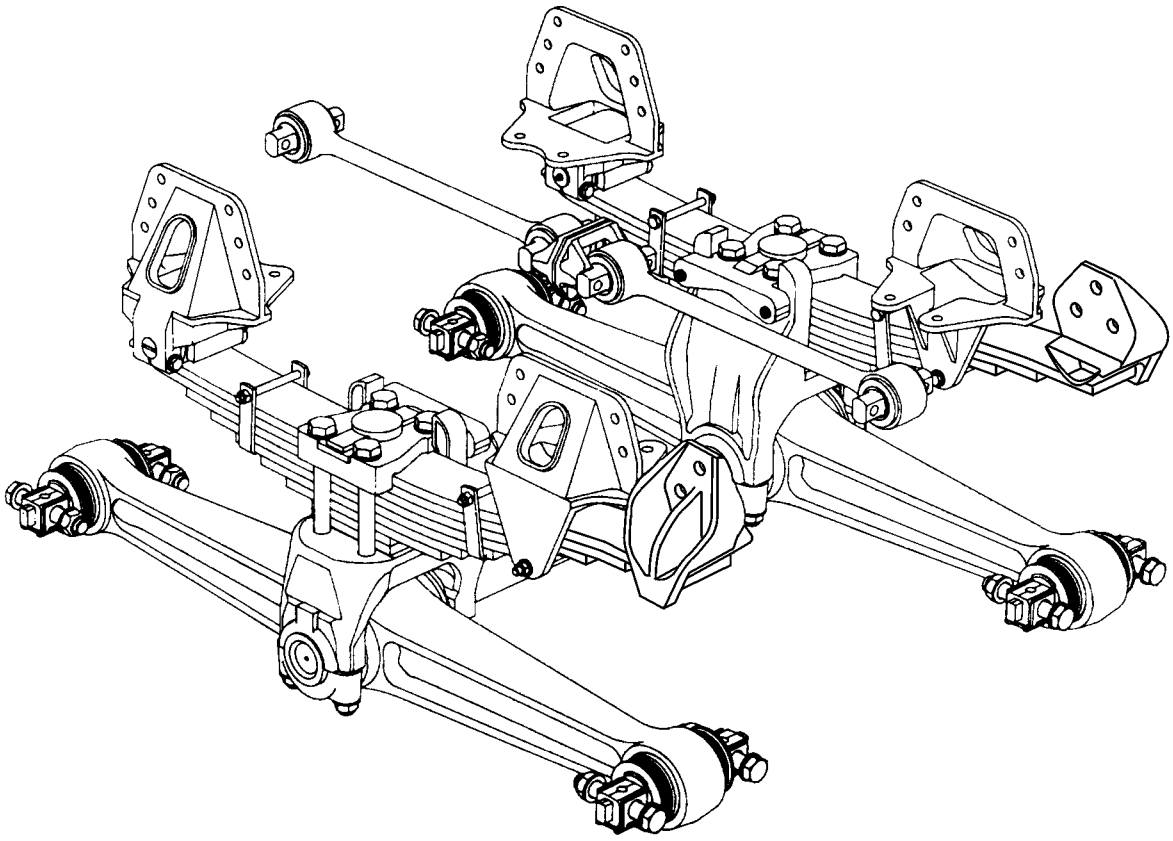
CAUTION

CREEP RATINGS CANNOT BE EXCEEDED! Operators using vehicles equipped with liftable auxiliary axles must consider these creep ratings when any liftable auxiliary axle is unloaded. The auxiliary axles should only be lifted (unloaded) to improve vehicle maneuverability in off-road use or when the vehicle is unloaded.

Notes

Design and Function

Hendrickson RT (Steel Spring)



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The Hendrickson RT suspension uses short, relatively stiff springs which are mounted on top of equalizing beams. The beams are attached to the underside of the axle housings providing a below-axle load suspension. The springs are fixed at one end to sturdy frame brackets. The opposite ends are of the slipper-type and contact frame brackets, providing a 4 – point frame mounting. Two torque rods eliminate the tendency of the drive axles to wind up during drive and brake torque conditions. The use of rubber bushings at noted oscillating points eliminates the need for lubrication.

This suspension is recommended for highway or off-highway use.

Notes

Center Bushings

The use of rubber or bronze bushings is dependent on a variety of factors dictated by the operating conditions and geographic location of the vehicle. These factors can be determined only by the experience of the operator. In the absence of this experience, use these general guidelines:

Center Bushing Application Guide									
Applications / Capacity		On-Hwy	Dump	Logger	Transit Mixer,		Refuse Packer		Off-Hwy
					<11 yd³	>11 yd³	<20 yd³	>20 yd³	
34K	Recommended	A	A	A			A		A
	Heavy Duty	A*, B	A*, B	A*, B			A*, B		A*, B
38-40K	Recommended	C, D	D	C, D	E		E		E
	Heavy Duty	E	E	E	D*	D*	D*	D*, E	D*
44-46K	Recommended	E	E		E		E		E
	Heavy Duty	D*, F*	D*, F*	D*, E, F*	D*, F*	F*	D*, F*	E, F*	F*
48-52K	Recommended	E	E	E					E
	Heavy Duty	F*	F*	F*		F*		E, F*	F*
See “Guidelines for Rubber or Bronze Bushing Applications”, page 38 for explanation of letters.									
*Transverse rods are MANDATORY with option indicated.									

Guidelines for Rubber or Bronze Bushing Applications

A 34,000 Rubber — standard 34K bushing offered by the truck manufacturer. It is an economical bushing, requiring no maintenance and providing satisfactory life for a variety of applications.

B 34,000 Bronze — this bushing can provide extended service life for tight cornering conditions. Proper preventive maintenance is required.

C 38,000 Rubber — this bushing, although no longer used for new vehicle production, is a highly economical 38K - rated bushing. It requires no maintenance and provides satisfactory life for its application.

D 40–46,000 Rubber — this high confinement bushing is the standard 40K bushing offered. It provides excellent service life for a variety of applications without required maintenance. Also used up to 46K with transverse rods.

E 8–52,000 Bronze — this is the standard release bushing provided at manufacture. It provides long life in severe service applications, and requires proper preventive maintenance.

F 46–52,000 Rubber — this fully bonded bushing requires the use of transverse rods at these ratings. It needs no maintenance, yet provides long life in severe service. Use of this bushing slightly reduces the available diagonal articulation.

Transverse Rod Applications

Transverse rods are mandatory for the following applications:

- All Walking Beam Series Suspensions, up to and including 23,600 kg (52,000 lb) capacity with axle spacing 1524 mm (60 in) or greater.
- All Walking Beam Series Suspensions, up to and including 23,600 kg (52,000 lb) capacity when used on front-end loader refuse packers (except with 40,000 lb suspension with bronze center bushings).
- All Air-Ride Series Suspensions.
- All HN Series Suspensions.
- All Walking Beam Series Suspensions with capacities of 20,00 – 23,600 kgs (44,000 – 52,000 lbs) when using rubber equalizing beam center bushings, regardless of axle spacing.

Transverse rods also are recommended where it is necessary to restrict the lateral movement of axles to prevent interference of tires, brakes, axle housings, and other components with the frame, body, or suspension components. This must be determined by the vehicle manufacturer prior to vehicle assembly.

Note: When transverse rods are used, the equalizing beam center bushing must be rubber. This may require changing from bronze center bushings (which are standard with some suspensions) to maintain the rating. A vehicle equipped with transverse rods may experience some reduction in suspension articulation or increased lateral stiffness and resistance to turning, especially with radial ply tires.

Notes

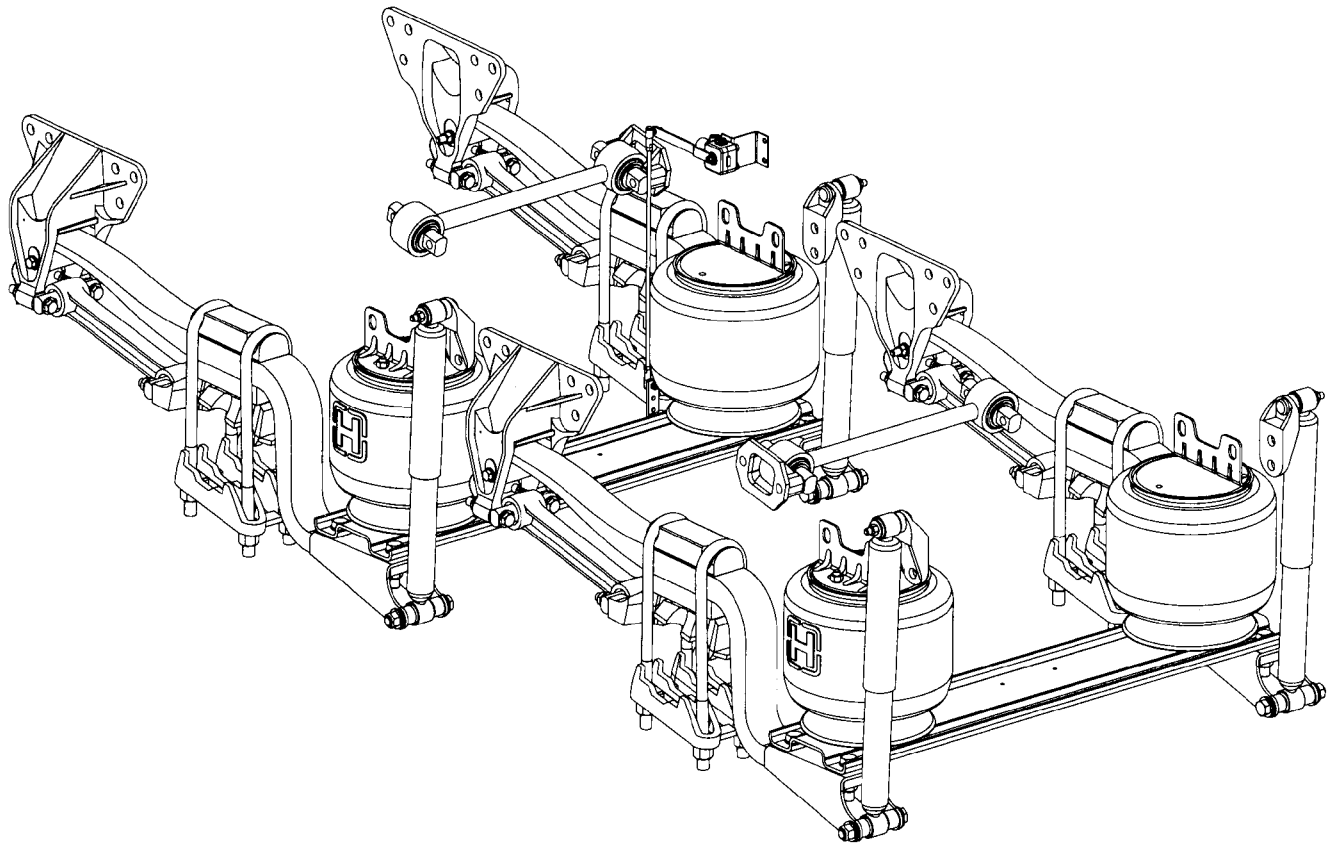
Air Suspension

Vehicles equipped with an air ride suspension absorb the variations in road conditions with an air spring and the assistance of a Z shaped leaf spring. The air suspension provides a smooth ride whether the vehicle is loaded or unloaded. It also reduces wear on tires and chassis.

The air springs are mounted to the Z leaf springs via a crossmember and attached to the frame on top. The Z spring mounts to the axle housing, spring hanger bracket and the radius leaf spring.

Air Suspension

Hendrickson HAS



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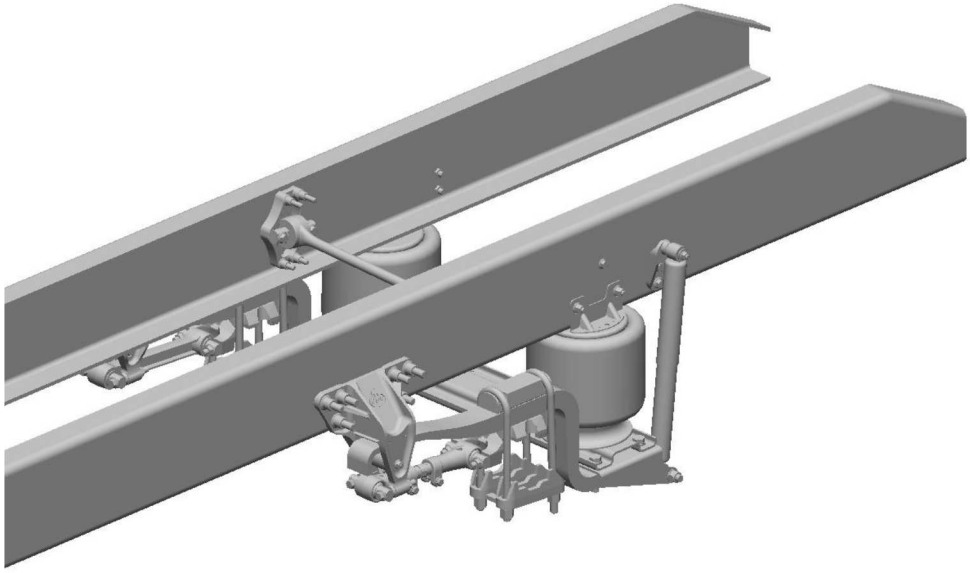

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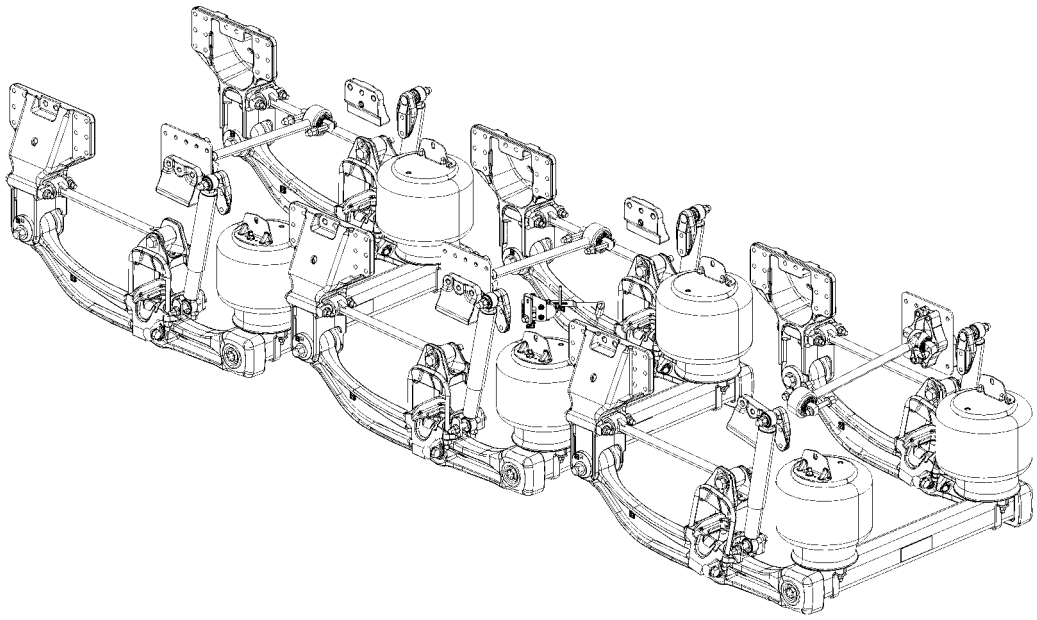
Hendrickson HAS Single Rear Suspension

The Hendrickson HAS air suspension is designed for up to 25% off-highway use. It features thicker main support members and premium longitudinal torque rods to handle rough off-highway bumps and shocks. This provides greater driver comfort and equipment protection off-highway, where other air suspensions cannot be used. It also is approved for use with an auxiliary lift axle.

Notes



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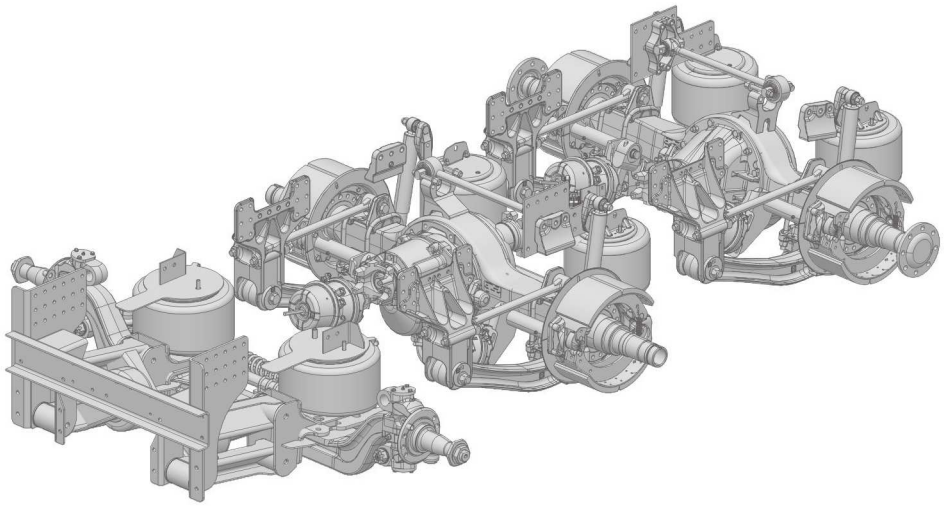

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Hendrickson Primaax Tandem Rear Suspension

Air System

A height control valve (1) — or leveling valve — regulates the air supply to the air springs. The valve is mounted inside the frame rail with a rod connecting the lever on the valve to air spring support crossbeam (4). Air is supplied to the suspension to the “B” system air tank. As weight is applied to the vehicle, the frame is forced downward so that the rod linkage forces the lever on the height control valve upward, allowing air pressure to flow through the valve and into the air spring.

As weight is removed from the vehicle, the frame rises, and the lever on the control valve is pulled down, releasing air from the air spring. A dash-mounted control valve allows the operator to raise or lower the suspension when connecting or disconnecting from a trailer.

For details on switch function, see “Pneumatic Switch Function”, page 44 .

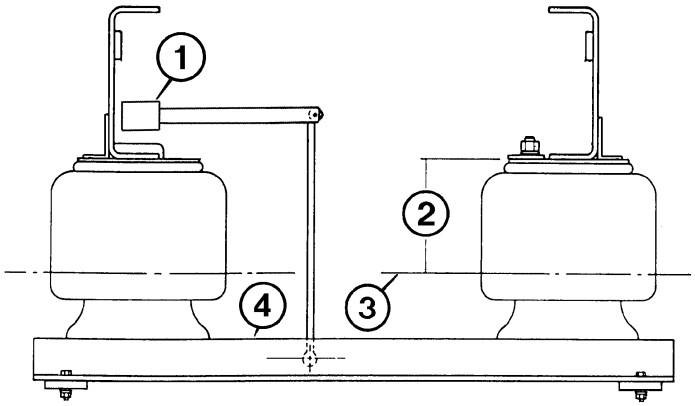

Fig. 10 Air System

1 Leveling Valve
2 Ride Height
3 Axle Centerline
4 Crossbeam (Pedestal Plate)

Notes

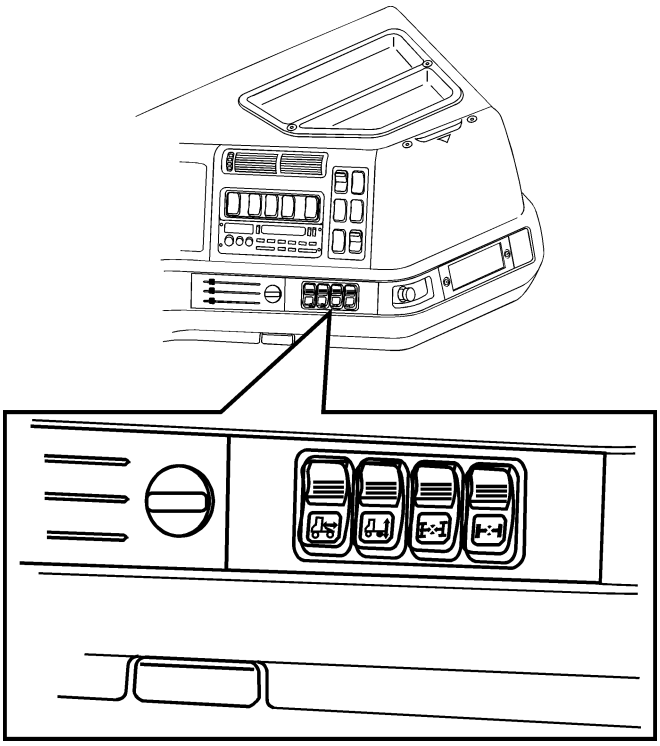

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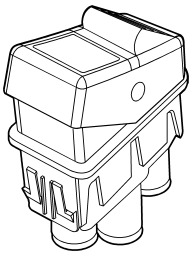
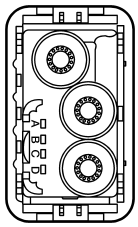
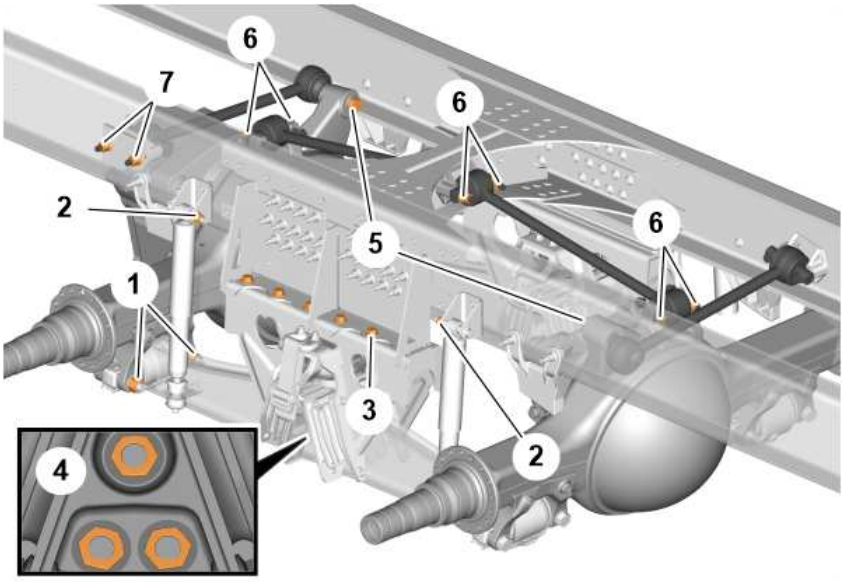
Fig. 11 Dash-mounted control valve (switches)

Pneumatic Switch Function

Switch	Switch Function	Terminal			
		A	B	C	D
 W3000574  W3000573	Interaxle DLO	To Cluster Telltale Lamp	+12 V Supply	Ground	+12 V Illumination Control
	Fifth Wheel Slide	To Cluster Telltale Lamp	Not Used	Ground	+12 V Illumination Control
	Suspension Dump	To Cluster Telltale Lamp	Not Used	Ground	+12 V Illumination Control
	Interwheel DLO	N/A	Not Used	Ground	+12 V Illumination Control

Hendrickson EX, RADD-HX



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This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair and rebuild of the Volvo suspension system.

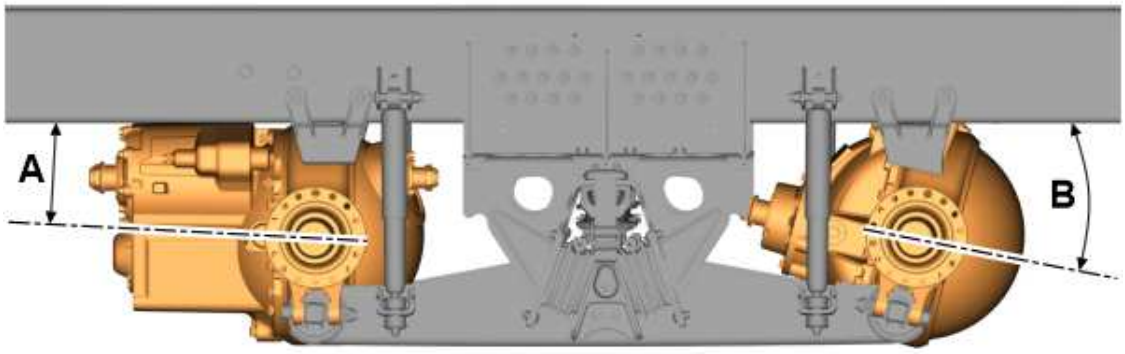
Note: Use only genuine Hendrickson parts for servicing this suspension system. For service instructions, please visit:

https://www.hendrickson-intl.com/

Torque Specifications

Sl. No.	Location	Diameter	Torque
1	Balance beam to axle	M24	900 ±140 Nm (664 ±103 lbf·ft)
2	Frame to Shock absorber bracket	M16	95 – 125 Nm (70 – 92 lbf·ft)
3	Frame suspension bracket to rubber suspension bracket	M16	353 ± 14 Nm (260 ±10 lbf·ft)
4	Beam saddle	M20	780 ± 34 Nm (575 ±25 lbf·ft)
5	Torque rod to axle		543 – 610 Nm (400 – 450 lbf·ft)
6	Torque rod to cross member	M16	275 ±45 Nm (203 ±33 lbf·ft)
7	Torque rod to frame	M16	275 ±45 Nm (203 ±33 lbf·ft)

Pinion angle



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			RTS1857D		RTS2031D		RT2173SM	
			Loaded	Unloaded	Loaded	Unloaded	Loaded	Unloaded
BSR1370	RSH-STD	1st drive axle (A)	2.5°	3.3°	2.5°	3.3°	2.5°	3.3°
		2nd drive axle (B)	12°	11.26°	11.5°	10.76°	11.5°	10.76°
	RSH-HIG	1st drive axle (A)	2.5°	3.55°	2.5°	3.55°	2.5°	3.55°
		2nd drive axle (B)	12°	11.07°	11.5°	10.56°	11.5°	10.56°
BSR1524	RSH-STD	1st drive axle (A)	2.5°	3.21°	2.5°	3.21°	2.5°	3.21°
		2nd drive axle (B)	12°	11.34°	10°	9.33°	10°	9.33°
	RSH-HIG	1st drive axle (A)	2.5°	3.43°	2.5°	3.43°	2.5°	3.43°
		2nd drive axle (B)	12°	11.16°	10°	9.15°	10°	9.15°

Notes

Air Suspension Height, Adjustment

Procedure:

⚠ DANGER

Do not attempt to repair or service this vehicle without sufficient training, the correct service literature, and the proper tools. Failure to follow this could make the vehicle unsafe and lead to serious personal injury or death.

⚠ CAUTION

The air suspension is set at the factory. Changing the ride height will affect the driveshaft angles and may cause driveline vibration and/or shorten component life. **Ride height adjustments must be performed in accordance with all documented service procedures.**

Note: After a suspension component replacement an alignment should be performed.

Note: Use special tool **J-44544**.

This document provides procedures for adjusting the air suspension.

1. Prepare the vehicle for the ride height calculation as follows:

- Park the vehicle on a level surface (the front wheels must be pointed straight ahead).
- Free and center all suspension joints by slowly moving the vehicle back and forth twice without using the brake. When coming to a complete stop, make sure the brakes (parking and service) are released.
- Chock the front wheels.

Note: Measurements must be performed on an unloaded vehicle.

2. Check all tires for proper inflation. Adjust tire air pressure to tire manufacturer's specifications.

3. Using the dash mounted rear suspension air dump switch release the air in the rear air spring, or disconnect the leveling rod from the leveling valve so that the pressure is released from the air springs.

⚠ WARNING

Avoid personal injury. BEFORE releasing air pressure from air springs, BE SURE neither your hand nor another persons hand, etc., is in a position where it could be pinched between components when the frame/suspension drops.

4. Start the engine and allow the air system to attain normal operating pressure of 827 kPa (120 psi). Turn off the engine.

5. Fill the rear air springs with air using the dash mounted switch or reconnect the actuator rod to the load leveling valve lever.

Ensure the air system is at normal operating pressure of 827 kPa (120 psi).

6. Measure the size of the frame.

Note: The ride height measurement is dependent on frame size.

7. Measure the distance from the floor to the center of the axle.

8. Measure the distance from the bottom edge of the frame to the floor.

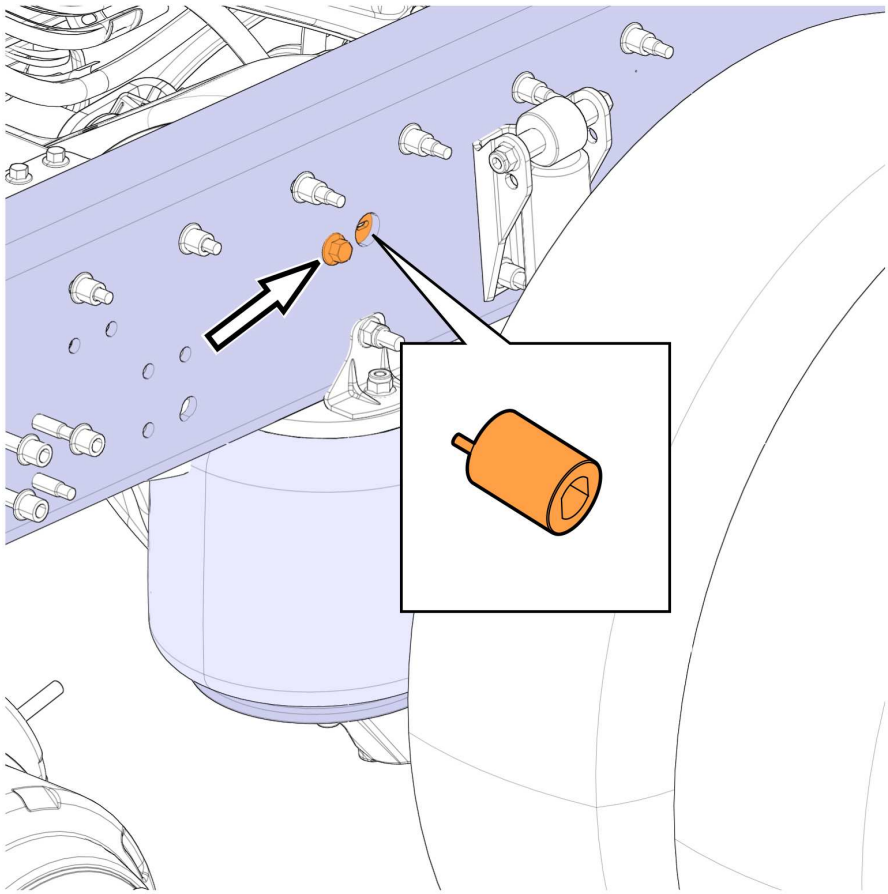
9. The difference in the two measurements is the ride height. Verify that the vehicle is at the correct ride height per Table A.

Table A – Frame Height and Ride Height Measurements

Frame Height mm (in.) including frame type	Ride Height mm. (in.) (unloaded)
266 (10.47) RRH-200	210 ± 5 (mm), 8.27 ± .2 (in)
300 (11.81) RRH–180	193 ± 5 (mm), 7.6 ± .2 (in)

10. Adjust the ride height (if required).

11. Loosen the fastener securing the load leveling valve to the frame. Use the ride height adjustment socket wrench to adjust the valve so the ride height is within specification. The suspension ride height is changed by turning the load leveling valve clockwise (to raise) or counter-clockwise (to lower). Tighten the fastener securing the load leveling valve to the frame to 175 ± 30 Nm (129± 22 ft-lb).



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12. Re-check the ride height to confirm the accuracy of the leveling valve adjustments.

13. Using the dash mounted rear suspension air dump switch release the air in the rear air spring, or disconnect the leveling rod from the leveling valve so that the pressure is released from the air springs.

WARNING

Avoid personal injury. BEFORE releasing air pressure from air springs, BE SURE neither your hand nor another persons hand, etc., is in a position where it could be pinched between components when the frame/suspension drops.

14. Start the engine and allow the air system to attain normal operating pressure of 827 kPa (120 psi). Turn off the engine.

15. Fill the rear air springs with air using the dash mounted switch or reconnect the actuator rod to the load leveling valve lever.

Ensure the air system is at normal operating pressure of 827 kPa (120 psi).

16. Re-check the ride height.

If the ride height measurement is not within the specifications. Check the leveling valve and other suspension components for wear of damage.

17. Apply the parking brake.

18. Remove the wheel chocks.

Rear Axle Literature

Printed copies of the rear axle literature are no longer available from the axle suppliers. Therefore, Volvo Trucks North America is unable to supply this printed literature to its dealers.

Service manuals for many of the supplier's rear axles are now available from the official web sites Dana Corporation and Meritor.

To review and download rear axle literature, please visit:

http://www.dana.com/wps/wcm/connect/dext2lit/DANA+RESOURCE/Critical+Resource

www.meritor.com/LOD

Notes

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